

EXHIBIT N:

Claim Chart for LG Electronics

DHS; S&T Directorate; “Cell-All” Request: Adding the 1st Ind. claim of the 1st Patent issued ‘497 to the Complainant (filed 04-05-06), illustrates infringement of Complainant’s claimed invention the same as: Ind. claim 1 of the ‘189 Patent; Ind. claim 22 of the ‘439 Patent; and, Ind. claim 5 of the ‘287 Patent. An example of the infringement is demonstrated below in a claim chart using the specifications of LG Electronics (i.e. LG is representative of the specifications of Apple, Samsung, and Qualcomm) for the development, manufacture, and commercialization of a Cell-All “WMD Electronic Detection Device”. The Synteka “MikroKera Ultra” integration with the Electronic Detection Device is also added.

LG Electronics: Electronic Detection Device	Patent #: 10,163,287; Independent Claim 5	Patent #: 9,589,439; Independent Claim 22	Patent #: 9,096,189; Independent Claim 1	Patent #: 7,385,497; Independent Claim 1
DHS; S&T “Cell-All” initiative. Develop detection device to detect deadly chemicals”. Stephen Dennis; PM: Contracts to Qualcomm, LG, Apple, and Samsung. Sensors will integrate with 261 million electronic devices (i.e. cell phones)	A communication device of at least one of a cell phone, a smart phone, a desktop, a handheld, a PDA, a laptop, or a computer terminal for monitoring products, interconnected to a product for communication therebetween, comprising:	A communication device of at least one of a cell phone, a smart phone, a desktop, a handheld, a PDA, a laptop, or a computer terminal for monitoring products,	A multi sensor detection and lock disabling system for monitoring products and for detecting chemical, biological, and radiological agents and compounds so that terrorist activity can be prevented, comprising:	A multi sensor detection and lock disabling system for monitoring products and for detecting chemical, biological, and radiological agents and compounds so that terrorist activity can be prevented, comprising:
The performance of LG’s electronic detection devices: CPU that’s at the core of the chipset is vital for the daily user experience and the general computing performance of the electronic detection devices (i.e. smartphone).	at least one central processing unit (CPU);	at least one of a central processing unit (CPU), a network processor, or a front end processor for communication between a host computer and other devices;	at least one of a central processing unit (CPU) for executing and carrying out the instructions of a computer program, a network processor which is specifically targeted at the networking application domain, or a front end processor for communication between a host computer and other devices;	at least one of a central processing unit (cpu); <i>Note: Golden's Patents for the Detector Case (i.e. CMDC device; electronic device) ornamental design that antedates Apple's 1st Patent for the Smartphone (i.e. electronic device) ornamental design is illustrated in a chart included in this document</i>

LG electronic detection devices has an internal temperature sensor which monitors the CPU and battery temperature of device	at least one temperature sensor in communication with the at least one CPU for monitoring temperature;	X	X	X
LG electronic detection devices, starting with <u>LG G2</u> , you can calibrate the motion sensor by going to Settings > General tab > Motion.	at least one motion sensor in communication with the at least one CPU;	X	X	X
LG's electronic detection devices: Thin Q has "the brightest" screen of any smartphone, thanks to its Super Bright Display technology.	at least one viewing screen for monitoring in communication with the at least one CPU;	X	X	each detector including a sound alarm indicator, a readings panel, a light alarm indicator and a sensor
LG's electronic detection devices: GPS with A-GPS, GLONASS, and BDS	at least one global positioning system (GPS) connection in communication with the at least one CPU;	whereupon a signal sent to the receiver of at least one of... a cell phone detection device... from a satellite or a cell phone tower or... a GPS connection... causes a signal that includes at least one of location data or sensor data to be sent to the communication device...	at least one satellite connection, Bluetooth connection, WiFi connection, internet connection, radio frequency (RF) connection, cellular connection, broadband connection, long and short range radio frequency (RF) connection, or GPS connection;	an Internet connection, a GPS connection, and a power connection located on the rear side and which are interconnected with the cpu;

	wherein at least one of a... WiFi connection, internet connection... capable of signal communication with... the communication device, the receiver of the communication device, or the central processing unit (CPU).	wherein the only type or types of communication with the transmitter and the receiver of the communication device and transceivers of the products is a type or types selected from the group consisting of satellite, Bluetooth, WiFi...	X
LG's electronic detection devices: Wi-Fi, Wi-Fi Direct	at least one of an internet connection or a Wi-Fi connection in communication with the at least one CPU;	at least one of a satellite connection, Bluetooth connection, WiFi connection, internet connection, cellular connection, long and/or short range radio frequency (RF) connection, or GPS connection;	X
LG's electronic detection devices: cellular connection; Bluetooth	at least one of a Bluetooth connection, a cellular connection, or a satellite connection in communication with the at least one CPU;	at least one locking mechanism in communication with the at least one CPU for locking the communication device, the at least one locking mechanism configured to at least one of engage (lock), disengage (unlock), or disable (make unavailable) locks;	X an automatic/mechanical lock disabler interconnected to the cpu and which is mounted to a lock on a product for receiving transmission from the cpu to lock or disable the lock on the product to prevent access to the product by unauthorized, untrained and unequipped individuals; and

<p>Battery Charging Specification, is power drawn from a USB port for charging. Three different sources of power: Standard downstream port (SDP), charging downstream port (CDP), and dedicated charging port (DCP). Wireless charging</p>	<p>at least one power source comprising at least one of a battery, electrical connection, or wireless connection, to provide power to the communication device;</p>	<p>an Internet connection, a GPS connection, and a power connection located on the rear side and which are interconnected with the cpu;</p>
		<p>wherein the communication device is equipped with a biometric lock disabler that incorporates at least one of a fingerprint recognition, voice recognition, face recognition, hand geometry, retina scan, iris scan and signature such that the communication device that is at least one of the cell phone, the smart phone, the desktop, the handheld, the PDA, the laptop or the computer terminal is locked by the biometric lock disabler to prevent unauthorized use</p>
	<p>at least one biometric sensor in communication with the at least once CPU for providing biometric authentication to access the communication device;</p>	<p>the communication device being equipped with biometrics that incorporates at least one of a fingerprint recognition or a face recognition to at least one of gain access to the device or to prevent unauthorized use;</p> <p>LG's electronic detection device features include sensors for face/smile detection, iris scanner, and fingerprint recognition.</p>

		a plurality of interchangeable detectors for detecting the chemical, biological and radiological agents and compounds and capable of being disposed within the detector case;	
Synkera MikroKera Ultra: wireless, wearable, mobile, device detects and identify chemicals in the air using a "sample jet" and sends detection data to another phone or a computer LG Watch Sport Smartwatch wireless, wearable, mobile, electronic detection device for chem /bio /human heart rate detection and monitoring at rest or active	the communication device being at least a fixed, portable or mobile communication device, equipped with at least one wired or wireless sensor for the detection of humans; therebetween...	the communication device is at least a fixed, portable or mobile communication device interconnected to a fixed, portable or mobile product, capable of wired or wireless communication	a plurality of indicator lights located on the front side with each indicator light corresponding to and indicating the detection of one specific chemical, biological and radiological agent and compound;
Synkera MikroKera Ultra: The device detects and identify chemicals in the air using a "sample jet" and sends detection data to another phone (e.g. Smartphone) or a computer "How does it work?" Shows indicator lights for the monitoring device; relayed over a cellular network to the monitoring center WMD sensor development for the Cell-All Initiative: Qualcomm, NASA, and Rhevision Technology	at least one of a chemical sensor, a biological sensor, an explosive sensor, a human sensor, a contraband sensor, or a radiological sensor; that is wired or wireless, capable of being disposed within, on, upon or adjacent the communication device;	wherein the communication device receives a signal via any of one or more products listed in any of the plurality of product grouping categories;	

<p>The LG electronic detection device, NFC is a short-range high frequency wireless communication technology; enables the exchange of data between devices; share content between digital devices.</p>	<p>at least one radio-frequency near-field communication (NFC) connection in communication with the at least one CPU...</p>	<p>the communication device being capable of wireless near-field communication (NFC) which allows radio frequency (RF) data to be at least one of received or transferred between the communication device and at least one tag that is read by the communication device;</p>	<p>X</p>	<p>whereupon detection of specific chemical, biological, or radiological agents or compounds by the detectors causes the lighting of the corresponding indicator light for visual confirmation of the detection and initiates signal transmission from the cpu to the automatic/mechanical lock disabler to lock or disable the lock of the product thereby preventing further contamination about the product and denying access to the product by unauthorized, untrained and unequipped individuals.</p>

		whereupon the communication device, is interconnected to a product equipped to receive signals from or send signals to lock or unlock doors, activate or deactivate security systems, activate or deactivate multi-sensor detection systems, or to activate or deactivate cell phone detection systems	X	
Voice Mate (i.e. Quick Voice; Q Voice) built-in application for various LG electronic detection devices (i.e. smartphone); automatic activation features; when car engine is started; lock and unlock doors, activate and deactivate security systems. LG SmartThinQ® app for smart home appliances built on an open platform, so it will work with evolving smart technologies and devices for years to come.	X			wherein at least one satellite connection, Bluetooth connection, WiFi connection, internet connection, radio frequency (RF) connection, cellular connection, broadband connection, long and short range radio frequency (RF) connection is capable of signal communication with the transmitter and the receiver of the communication device and transceivers of the products;
LG's electronic detection devices (i.e. at least LG G5 & LG V10 smartphones, and LG Watch Sport Smartwatch	X		X	

TECHNICAL and DOMESTIC CLAIM CHARTS

Enclosures:

TECHNICAL CLAIM CHART for LG V30

TECHNICAL CLAIM CHART for LG G6

DOMESTIC CLAIM CHART for LG

HISTORY - 2007

Submitted by Complainant: Larry Golden

LG V30

Technical Rational

**COMPLAINANT'S DEVICE: CMDC
INTERCONNECTION CAPABILITIES
RESPONDENT'S MOBILE DEVICE: LG V30**

<p>LG Electronics: LG V30 Smartphone interconnected to the LG Watch Sport (Mobile Device Industry; Electronic Device Industry; Government Industry)</p>	<p>Manufacture for the Government; 2008: The "Cell-All" initiative. The Department of Homeland Security's (DHS) Science and Technology Directorate (S&T), Cell-All aims "to equip your cell phone with a sensor capable of detecting deadly chemicals", says Stephen Dennis, Cell-All's program manager. S&T pursued cooperative agreements with four cell phone manufacturers: Qualcomm, LG, Apple, and Samsung. Used by the Government; 2016: Both the LG V30 and G6 smartphones can be used by the Department of Defense. The LG smartphones received a security certification from the U.S. Defense Information Systems Agency, as well as a certification by the National Information Assurance Partnership. Sensors will integrate with 261 million cell phones now used in the U.S. Leverage billions of dollars spent each year in sensor, carrier network and cell phone development.</p>	<p>Patent #: 9,589,439; Independent Claim 22</p>
		<p>18. The communication device of [claim 11] wherein the communication device having a basic monitoring terminal can be adapted and incorporated to include desktop computers, notebook, PC's, laptops, cell phones, smart phones, LCD monitors, and satellite monitoring</p>

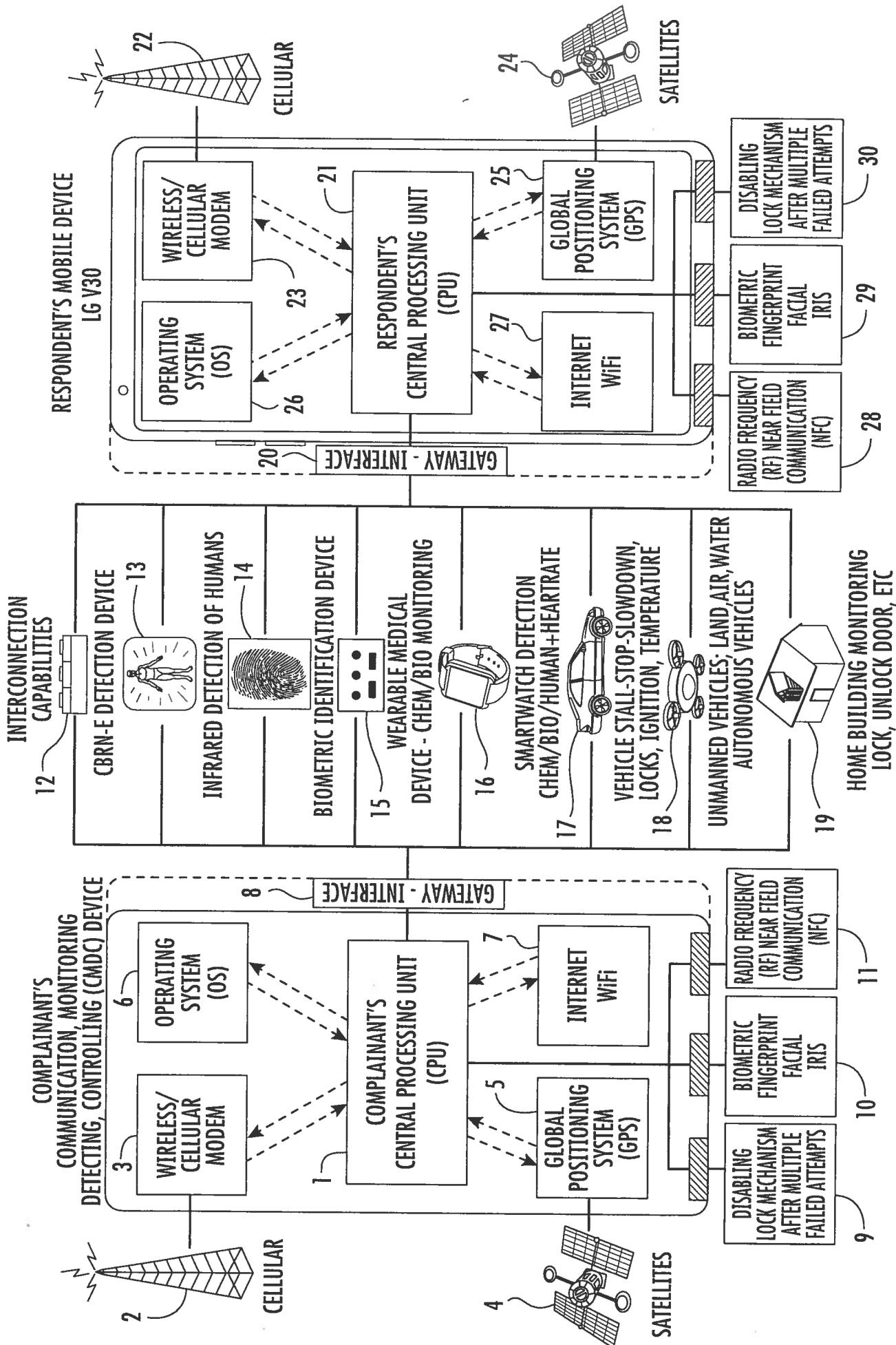
<p>The LG Watch Sport is, well, sporty-looking with a big 1.38-inch, 480-by-480 P-OLED display. The device has two buttons for convenient navigation and integrates multiple sensors, including an accelerometer, barometer, ambient light, GPS, and a PPM sensor (short for photoplethysmogram, which accurately tracks heart rate when the wearer is at rest or active).</p>	<p>at least one of a chemical sensor, a biological sensor, an explosive sensor, a human sensor, a contraband sensor, or a radiological sensor; that is wired or wireless, capable of being disposed within, on, upon or adjacent the communication device;</p>	<p>118. The multi-sensor detection system [of claim 103] wherein the cell phone, the smart phone, and the cell phone detector case have a plurality of sensors for detecting at least one of a chemical, biological, radiological, nuclear, explosive and contraband agents and compounds which are capable of being disposed within the cell phone, the smart phone, or the cell phone detector case.</p>
	<p>LG V30 CPU: Octa-core (4x2.45 GHz Kryo & 4x1.9 GHz Kryo). The LG smartphones is equipped with more advanced embedded chipsets that can do many different tasks depending on their programming. The performance of the CPU that's at the core of the chipset is vital for the daily user experience and the general computing performance of the smartphone. LG V30 Chipset: Qualcomm MSM8998 Snapdragon 835</p>	<p>12. The communication device [of claim 11] wherein each communication device includes at least one of an internet connection, a GPS connection, a radio frequency (RF) connection, or a central processing unit (cpu);</p>
	<p>Transmits signals through at least one of a cellular, a long or short range radio frequency, or a Bluetooth connection. You can use Bluetooth to transfer information between LG V30 phone and another Bluetooth-enabled device. Quick message is the specified text message to send out.</p>	<p>28. The communication device [of claim 11] wherein the communication device can send and receive signals, send and receive warnings, send and receive commands, send and receive data, information and report the status of the sensors and operational equipment systems to and from a cell phone, smart phone, PDA or handheld device.</p>

Receives signals through at least one of a cellular, a long or short range radio frequency, or a Bluetooth connection. LG V30 User Guide: Notifications: Enable this option if you wish to receive a notification when a new text or multimedia message arrives.	a receiver for receiving signals, data or messages from at least one of a multi-sensor detection device, a cell phone detection device, or a locking device;	28. The communication device [of claim 11] wherein the communication device can send and receive signals, send and receive warnings, send and receive commands, send and receive data, information and report the status of the sensors and operational equipment systems to and from a cell phone, smart phone, PDA or handheld device.
	LG V30 cellular connection; Wi-Fi 802.11 a/b/g/n/ac, dual-band, Wi-Fi Direct, DLNA, hotspot; Bluetooth 5.0, A2DP, LE, aptX HD; GPS, with A-GPS, GLONASS, and GALILEO	25. The communication device [of claim 11] wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.
	the communication device being at least a fixed, portable or mobile communication device, equipped with at least one wired or wireless sensor for the detection of humans; LG V30 features include sensors for face/smile detection, iris scanner, and fingerprint recognition.	30. The communication device [of claim 11] wherein the communication device is designed to be used with or without biometrics for authentication and identification, with at least one of a fingerprint recognition, voice recognition, face recognition, hand geometry, retina scan, iris scan, heart rate, pulse or signature, thereby allowing access to the product by authorized, trained, and equipped individuals and preventing access to the product by unauthorized, untrained, and unequipped individuals.

<p>After 5 unsuccessful attempts to unlock the LG smartphone, the user is prompted to enter a text phrase to confirm that they are trying to unlock the phone. The user has 10 opportunities to enter the unlock sequence. After 10 unsuccessful attempts, the phone will automatically perform a factory data reset and all of the personal files will be erased. The user is warned after the 9th unsuccessful attempt. If a Knock Code is set, after 6 unsuccessful attempts, the user is prompted to enter the Backup PIN to unlock the phone.</p>	<p>22. The communication device [of claim 11] wherein the communication device is designed to be equipped with applications for the locking, disabling a lock, enabling a lock, and unlocking the locks of, but not limited to, containers, vehicles, houses and businesses, using a smart phone, cell phone, PDA, laptop or desktop</p>
	<p>30. The communication device [of claim 11] wherein the communication device is designed to be used with or without biometrics for authentication and identification, with at least one of a fingerprint recognition, voice recognition, face recognition, hand geometry, retina scan, iris scan, heart rate, pulse or signature, thereby allowing access to the product by authorized, trained, and equipped individuals and preventing access to the product by unauthorized, untrained, and unequipped individuals.</p>
<p>LG V30 features include sensors for face/smile detection, iris scanner, and fingerprint identification.</p>	<p>the communication device being equipped with biometrics that incorporates at least one of a fingerprint recognition or a face recognition to at least one of gain access to the device or to prevent unauthorized use;</p>

<p>The LG V30 NFC is a short-range high frequency wireless communication technology that enables the exchange of data between devices over about a 10 cm distance. It allows users to share content between digital devices, and even use their LG smartphone on existing contactless infrastructure. The significant advantage of NFC over Bluetooth is the shorter set-up time (under a 1/10 second).</p>	<p>the communication device being capable of wireless near-field communication (NFC) which allows radio frequency (RF) data to be at least one of received or transferred between the communication device and at least one tag that is read by the communication device;</p>	<p>20. The communication device [of claim 11] wherein the communication device can be interconnected through wire or wireless for communication, signals, commands and transmission of data.</p>
	<p>LG V30 cellular connection; Wi-Fi 802.11 a/b/g/n/ac, dual-band, Wi-Fi Direct, DLNA, hotspot; Bluetooth 5.0, A2DP, LE, aptX HD; GPS, with A-GPS, GLONASS, and GALILEO. Smartphone manufacturers and operators have introduced the Assisted GPS technology, which downloads the current ephemeris for a few days ahead via the wireless networks and helps triangulate the general user's position with the cell towers thus allowing the GPS receiver to get a faster lock at the expense of several (kilo)bytes.</p>	<p>whereupon a signal sent to the receiver of at least one of a multi-sensor detection device, a cell phone detection device, or a locking device from a satellite or a cell phone tower or through at least one of a Bluetooth connection, a WiFi connection, an internet connection, a cellular connection, a GPS connection, a short range radio frequency (RF) connection, or a long range radio frequency (RF) connection, causes a signal that includes at least one of location data or sensor data to be sent to the communication device; and</p> <p>25. The communication device [of claim 11] wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.</p>

<p>Transmits and receives signals through at least one of a cellular, a long or short range radio frequency, or a Bluetooth connection. You can use Bluetooth to transfer information between LG V30 phone and another Bluetooth-enabled device. Quick message is the specified text message to send out. LG V30 User Guide: Notifications: Enable this option if you wish to receive a notification when a new text or multimedia message arrives.</p>	<p>wherein at least one of a satellite connection, Bluetooth connection, WiFi connection, internet connection, cellular connection, long range radio frequency (RF) connection, or short range radio frequency (RF) connection, capable of signal communication with the transmitter of the communication device, the receiver of the communication device, or the central processing unit (CPU).</p>	<p>28. The communication device [of claim 11] wherein the communication device can send and receive signals, send and receive warnings, send and receive commands, send and receive data, information and report the status of the sensors and operational equipment systems to and from a cell phone, smart phone, PDA or handheld device.</p>
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1. Complainant's Central Processing Unit (CPU): [Patent RE43,990]; Claim 16. The communication device of claim 11 wherein the communication device can be adapted or incorporated with cell phone towers and satellites for use with satellite communication and/or a cell tower, wi-max, broadband, GPS, navigation, radio frequency (RF) chips, radio frequency (RF) sensors, radio frequency (RF) transceivers, and radio frequencies for short and long range transmissions interconnected to the central processing unit (cpu).
2. Cellular: [Patent RE43,990]; Claim 25. The communication device of claim 11 wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.
3. Wireless/Cellular Modem: [Patent RE43,990]; Claim 25. The communication device of claim 11 wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.
4. Satellites: [Patent RE43,990]; Claim 25. The communication device of claim 11 wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, a satellite connection, and a GPS connection.
5. Global Positioning System (GPS): [Patent RE43,990]; Claim 12. The communication device of claim 11 wherein each communication device includes at least one of an internet connection, a GPS connection, a radio frequency (RF) connection, or a central processing unit (cpu).
6. Operating System (OS): [Patent RE43,990] Claim 25. The communication device of claim 11 wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.
7. Internet WiFi: [Patent RE43,990]; Claim 12. The communication device of claim 11 wherein each communication device includes at least one of an internet connection, a GPS connection, a radio frequency (RF) connection, or a central processing unit (cpu).
8. Gateway – Interface: [Patent RE43,990]; Claim 32. The communication device of claim 11 wherein the communication device having products to be monitored, the devices that are monitoring, communication devices, communication equipment can be grouped into anti-terrorist product groupings based on the categories of similarities of design of at least one of; sensors, software, interfaces, detector cases, locks, mobile communication devices, handheld communication devices, vehicle slowing and stopping devices.

9. Disabling Lock Mechanism after Multiple Failed Attempts: [Patent RE43,990]; Claim 22. The communication device is designed to be equipped with applications for the locking, disabling a lock, enabling a lock, and unlocking the locks of, but not limited to, containers, vehicles, houses and businesses, using a smart phone, cell phone, PDA, laptop or desktop.
 10. Biometric Fingerprint Facial Iris: [Patent RE43,990]; Claim 30. The communication device of claim 11 wherein the communication device is designed to be used with or without biometrics for authentication and identification, with at least one of a fingerprint recognition...
 11. Radio Frequency (RF) Near Field Communication (NFC): [Patent RE43,990]; Claim 23. The communication device is designed to be equipped with a radio frequency (RF) chip for the locking, disabling a lock, enabling a lock, and unlocking the locks of, but not limited to, containers, vehicles, houses and businesses, capable of a two-way, bi-directional radio frequency (RF) communication link that makes the communication device work as a radio frequency (RF) sensor or a radio frequency (RF) transceiver.
 12. CBRN-E Detection Device: [Patent RE43,990]; Claim 26. The communication device of claim 11 wherein the plurality of sensors for detecting the chemical, biological, radiological, nuclear, explosive and contraband agents and compounds which is designed to be used with or without biometrics for authentication and identification, with at least one of a fingerprint recognition...
 13. Infrared Detection of Humans: [Patent RE43,990]; Claim 31. The communication device of claim 11 wherein the human vital sensors of; a heart sensor, a nerve sensor, a perspiration sensor, an inflammation sensor, a pulse sensor, a blood pressure sensor, a temperature sensor, a breath sensor, or a radiation sensor.
 14. Biometric Identification Device: [Patent RE43,990]; Claim 30. The communication device of claim 11 wherein the communication device is designed to be used with or without biometrics for authentication and identification, with at least one of a fingerprint recognition...
 15. Wearable Medical Device – Chem/Bio Monitoring: [Patent RE43,990]; Claim 97. The multi-sensor detection system of claim 11 wherein the communication device is capable of being embedded into; placed in, on, or adjacent to a product or area targeted for monitoring...
 16. Smartwatch Detection Chem/Bio/Human/Heartrate: [Patent RE43,990]; Claim 118. The multi-sensor detection system of claim 81, wherein the cell phone, the smart phone, and the cell phone detector case have a plurality of sensors for detecting at least one of a chemical, biological, radiological, nuclear, explosive and contraband agents and compounds which are capable of being disposed within the cell phone, the smart phone, or the cell phone detector case.
 17. Vehicle Stall-Stop-Slowdown, Locks, Ignition, Temperature: [Patent RE43,990]; Claim 15. The communication device of claim 11 wherein the communication device capable of sending signals to the vehicle's operating equipment systems of at least one of, but not limited to, an ignition

for starting and stopping, a lock for unlocking and locking, a horn for sounding; capable of receiving data and diagnostic information of the vehicle's operating equipment systems.

18. Unmanned Vehicles; Land, Air, Water Autonomous Vehicles: [Patent RE43,990]; Claim 15. The communication device of claim 11 wherein the communication device capable of sending signals to the vehicle's operating equipment systems of at least one of, but not limited to, an ignition for starting and stopping, a lock for unlocking and locking, a horn for sounding; capable of receiving data and diagnostic information of the vehicle's operating equipment systems.
19. Home Building Monitoring Lock, Unlock Door, Etc.: [Patent RE43,990]; Claim 22. The communication device of claim 11 wherein the communication device is designed to be equipped with applications for the locking, disabling a lock, enabling a lock, and unlocking the locks of, but not limited to, containers, vehicles, houses and businesses, using a smart phone, cell phone, PDA, laptop or desktop.
20. Gateway – Interface: With the smartwatch, the smartphone is the gateway. Using smartphones as our gateway to the Internet of Things we can add more context into activities. A complete Internet of Things (IoT) system integrates four distinct components: sensors/devices, connectivity, data processing, and a user interface. The sensors/devices can be connected to the cloud through a variety of methods including: cellular, satellite, WiFi, Bluetooth, low-power wide-area networks (LPWAN), or connecting directly to the internet.
21. Respondent's Central Processing Unit (CPU): This is the "brain" of the smartphone. The central processing unit (CPU) receives commands, makes instant calculations, and sends signals throughout the device. How the parts of the processor work together: The CPU connectivity features (GPS, WiFi), and 3G/4G modem are the major components of a mobile processor that control the operation of some of the most powerful and power-efficient smartphones.
22. Cellular: A smartphone is essentially a two-way radio, consisting of a radio transmitter and a radio receiver. When you chat with your friend on your smartphone, your phone converts your voice into an electrical signal, which is then transmitted via radio waves to the nearest cellular tower. The network of cell towers then relays the radio wave to your friend's smartphone, which converts it to an electrical signal and then back to sound again. In the basic form, a smartphone works just like a walkie-talkie.
23. Wireless/Cellular Modem: These components control your connection to the world. Broadly speaking, the RF Transceiver receives and transmits voice connections and the modem enables your phone to send and receive digital signals. When enabled with 4G LTE, the radio and modem have a high-speed cellular wireless network at their disposal, capable of speeds that mimic your home Wi-Fi connection. When working closely with the CPU and GPU, a 4G LTE modem can deliver seamless, fluid access from your LTE network to your applications.
24. Satellites: There are 24 satellites (with an additional three orbiting on standby - just in case), although your smartphone's GPS only needs to receive signals from a fraction of them at any one time, with three satellites your smartphone can calculate a 2D position and track your movement. Four or more satellites enables a 3D position, adding altitude to latitude and longitude, and allowing for more effective tracking.

25. Global Positioning System (GPS): Your smartphone's GPS receiver analyzes high-frequency radio waves sent out from each satellite, with synchronized clocks in both the receiver and satellite recording the time that signals are transmitted, with the GPS chip timing exactly how long it takes to get from the satellite to your mobile phone – and it knows the speed of the signal, so with both those pieces of information, it can work out the distance from the satellite. As long as your mobile device is receiving signal from three or more satellites, it's possible to work out where you are, by calculating how far you are from each satellite.
26. Operating System (OS): Mobile operating systems combine features of a personal computer operating system with other features useful for mobile or handheld use, usually including, and most of the following considered essential in modern mobile systems; a cellular, Bluetooth, Wi-Fi, Global Positioning System (GPS) mobile navigation, speech recognition, near field communication (NFC)
27. Internet WiFi: Connected devices also generate massive amounts of Internet traffic, including loads of data that can be used to make the devices useful. The Internet of Things (IoT), also sometimes referred to as the Internet of Everything (IoE), consists of all the web-enabled devices that collect, send and act on data they acquire from their surrounding environments using embedded sensors, processors and communication hardware. These devices, often called "connected" or "smart" devices, can sometimes talk to other related devices, a process called machine-to-machine (M2M) communication. The sensors/devices can be connected to the cloud through a variety of methods including: cellular, satellite, WiFi, Bluetooth, low-power wide-area networks (LPWAN), or connecting directly to the internet.
28. Radio Frequency (RF) Near Field Communication (NFC): NFC is a method of wireless data transfer that detects and then enables technology in close proximity to communicate without the need for an internet connection. The tech involved is deceptively simple: an NFC chip operates as one part of a wireless link. Once it's activated by another chip, small amounts of data between the two devices can be transferred when held a few centimeters from each other.
29. Biometric Fingerprint, Facial, and Iris: Previously seen mostly in military devices and fixed installations, iris scanning is joining other biometric authentication methods (such as fingerprint scanning, facial recognition and voice recognition) intended to move mobile devices beyond the limitations of password-based security.
30. Disabling Lock Mechanism after Multiple Failed Attempts: If you or someone else enters the wrong passcode too many times, your device will disable itself temporarily. The device can be remotely wiped after the specified number of failed password attempts.

Technical Rational

COMPLAINANT'S DEVICE: CMDC

CBRNE-H DETECTION DEVICE

RESPONDENT'S MOBILE DEVICE: LG V30

Android app (GammaPix) for the LG V30. (Government Industry: Military; Law Enforcement; First Responders; other Gov't Employees)	Patent #: 9,589,439; Independent Claim 13	Patent #: RE 43,990; Dependent Claims
Android app (for the LG V30) uses software and the smartphone's camera to measure radioactivity levels, allowing users to find out whether their environments are safe; the software is the civilian version of technology developed under contracts with the U.S. Department of Defense and with DHS. East Hartford, Connecticut-based Image Insight Inc. announced the release of their first commercial product, the GammaPix app for Android phones. The app uses software and the smartphone's camera to measure radioactivity levels, allowing users to find out whether their environments are safe. GammaPix can be used for detection of radioactivity in everyday life: exposure on airplanes, medical procedures, or contaminated products. The system also detects hazards from less common events such as accidents at nuclear power plants, a terrorist attack by a dirty bomb, or quietly placed radioactive silent sources.	A communication device of at least one of a cell phone, a smart phone, a desktop, a handheld, a personal digital assistant (PDA), a laptop, or a computer terminal for monitoring products, interconnected to a product for communication therebetween, comprising:	18. The communication device [of claim 11] wherein the communication device having a basic monitoring terminal can be adapted and incorporated to include desktop computers, notebook, PCs, laptops, cell phones, smart phones, LCD monitors, and satellite monitoring.

<p>GammaPix can be used for detection of radioactivity in everyday life: exposure on airplanes, medical procedures, or contaminated products. The system also detects hazards from less common events such as accidents at nuclear power plants, a terrorist attack by a dirty bomb</p>	<p>at least one of a chemical sensor, a biological sensor, an explosive sensor, a human sensor, a contraband sensor, or a radiological sensor; that is wired or wireless, capable of being disposed within, on, upon or adjacent the communication device;</p> <p>LG V30 CPU: Octa-core (4x2.45 GHz Kryo & 4x1.9 GHz Kryo). The LG smartphones is equipped with more advanced embedded chipsets that can do many different tasks depending on their programming. The performance of the CPU that's at the core of the chipset is vital for the daily user experience and the general computing performance of the smartphone. LG V30 Chipset: Qualcomm MSM8998 Snapdragon 835</p>	<p>118. The multi-sensor detection system [of claim 103] wherein the cell phone, the smart phone, and the cell phone detector case have a plurality of sensors for detecting at least one of a chemical, biological, radiological, nuclear, explosive and contraband agents and compounds which are capable of being disposed within the cell phone, the smart phone, or the cell phone detector case.</p> <p>12. The communication device [of claim 11] wherein each communication device includes at least one of an internet connection, a GPS connection, a radio frequency (RF) connection, or a central processing unit (cpu).</p> <p>28. The communication device [of claim 11] wherein the communication device can send and receive signals, send and receive warnings, send and receive commands, send and receive data, information and report the status of the sensors and operational equipment systems to and from a cell phone, smart phone, PDA or handheld device.</p> <p>Transmits and receives signals to activate and deactivate through at least one of a cellular, a long or short range radio frequency, or a Bluetooth connection. You can use Bluetooth to transfer information between LG V30 phone and another Bluetooth-enabled device.</p>
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<p>Receives signals through at least one of a cellular, a long or short range radio frequency, or a Bluetooth connection. LG V30 User Guide: Notifications: Enable this option if you wish to receive a notification when a new text or multimedia message arrives.</p>	<p>LG V30 cellular connection; Wi-Fi 802.11 a/b/g/n/ac, dual-band, Wi-Fi Direct, DLNA, hotspot; Bluetooth 5.0, A2DP, LE, aptX HD; GPS, with A-GPS, GLONASS, and GALILEO (satellites)</p>	<p>LG V30 cellular connection; Wi-Fi 802.11 a/b/g/n/ac, dual-band, Wi-Fi Direct, DLNA, hotspot; Wireless Bluetooth 5.0, A2DP, LE, aptX HD; GPS, with A-GPS, GLONASS, and GALILEO (satellites)</p>
<p>28. The communication device [of claim 11] wherein the communication device can send and receive signals, send and receive warnings, send and receive commands, send and receive data, information and report the status of the sensors and operational equipment systems to and from a cell phone, smart phone, PDA or handheld device.</p>	<p>25. The communication device [of claim 11] wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.</p>	<p>20. The communication device [of claim 11] wherein the communication device can be interconnected through wire or wireless for communication, signals, commands and transmission of data.</p>

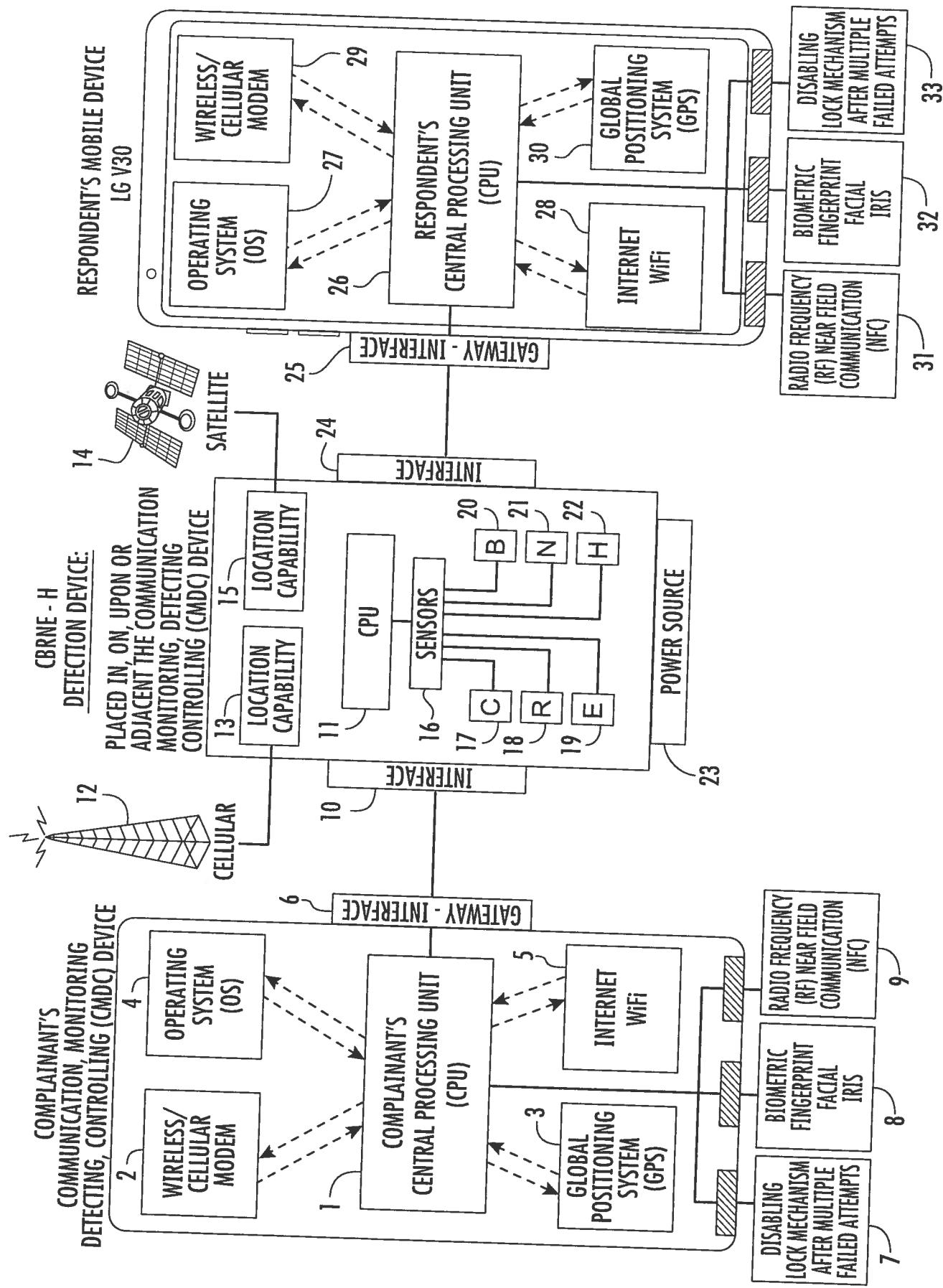
<p>Transmits and receives signals to activate and deactivate through at least one of a cellular, a long or short range radio frequency, or a Bluetooth connection. You can use Bluetooth to transfer information between LG V30 phone and another Bluetooth-enabled device.</p>	<p>whereupon the communication device, is interconnected to a product equipped to receive signals from or send signals to lock or unlock locking devices, activate or deactivate security systems, activate or deactivate multi-sensor detection systems, or to activate or deactivate cell phone detection systems;</p>	<p>28. The communication device [of claim 11] wherein the communication device can send and receive signals, send and receive warnings, send and receive commands, send and receive data, information and report the status of the sensors and operational equipment systems to and from a cell phone, smart phone, PDA or handheld device.</p> <p>32. The communication device [of claim 11] wherein the communication device having products to be monitored, the devices that are monitoring, communication devices, communication equipment can be grouped into anti-terrorist product groupings based on the categories of similarities of design of at least one of; sensors, software, interfaces, detector cases, locks, mobile communication devices, handheld communication devices, vehicle slowing and stopping devices, specification... similarities in material composition... ; similarities in security problems of at least one of; theft, detection for chemical, biological, radiological, nuclear, explosive compounds and agents, detection for weapons of mass destruction, biometrics for identifying terrorist, scanning to identify a terrorist threat; grouping security devices to form a network of ubiquitous sensing...</p>
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<p>LG V30 cellular connection; Wi-Fi 802.11 a/b/g/n/ac, dual-band, Wi-Fi Direct, DLNA, hotspot; Bluetooth 5.0, A2DP, LE, aptX HD; GPS, with A-GPS, GLONASS, and GALILEO.</p> <p>Smartphone manufacturers and operators have introduced the Assisted GPS technology, which downloads the current ephemeris for a few days ahead via the wireless networks and helps triangulate the general user's position with the cell towers thus allowing the GPS receiver to get a faster lock at the expense of several (kilo)bytes.</p>	<p>wherein the at least one of the satellite connection, internet connection, radio frequency (RF) connection, cellular connection, broadband connection, long range radio frequency (RF) connection, or short range radio frequency (RF) connection is capable of signal communication with the transmitter, the receiver of the communication device, or transceivers of the products;</p> <p>25. The communication device [of claim 11] wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.</p>
	<p>30. The communication device [of claim 11] wherein the communication device is designed to be used with or without biometrics for authentication and identification, with at least one of a fingerprint recognition, voice recognition, face recognition, hand geometry, retina scan, iris scan, heart rate, pulse or signature, thereby allowing access to the product by authorized, trained, and equipped individuals and preventing access to the product by unauthorized, untrained, and unequipped individuals.</p> <p>wherein the communication device is equipped with a biometric lock disabler that incorporates at least one of a fingerprint recognition, voice recognition, face recognition, hand geometry, retina scan, iris scan, or signature such that the communication device that is at least one of the cell phone, the smart phone, the desktop, the handheld, the PDA, the laptop or the computer terminal is locked by the biometric lock disabler to prevent unauthorized use;</p> <p>LG V30 features include sensors for face/smile detection, iris scanner, and fingerprint recognition.</p>

LG V30 cellular connection; Wi-Fi 802.11 a/b/g/n/ac, dual-band, Wi-Fi Direct, DLNA, hotspot; Bluetooth 5.0, A2DP, LE, aptX HD; GPS, with A-GPS, GLONASS, and GALILEO. Smartphone manufacturers and operators have introduced the Assisted GPS technology, which downloads the current ephemeris for a few days ahead via the wireless networks and helps triangulate the general user's position with the cell towers thus allowing the GPS receiver to get a faster lock at the expense of several (kilo)bytes.

wherein the only type or types of communication with the transmitter and the receiver of the communication device and transceivers of the products is a type or types selected from the group consisting of satellite, Bluetooth, WiFi, internet, radio frequency (RF), cellular, broadband, long range radio frequency (RF), and short range radio frequency (RF).

25. The communication device of [claim 11] wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.



1. Complainant's Central Processing Unit (CPU): [Patent RE43,990]; Claim 16. The communication device of claim 11 wherein the communication device can be adapted or incorporated with cell phone towers and satellites for use with satellite communication and/or a cell tower, wi-fi, wi-max, broadband, GPS, navigation, radio frequency (RF) chips, radio frequency (RF) sensors, radio frequency (RF) transceivers, and radio frequencies for short and long range transmissions interconnected to the central processing unit (cpu).
2. Wireless/Cellular Modem: [Patent RE43,990]; Claim 25. The communication device of claim 11 wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.
3. Global Positioning System (GPS): [Patent RE43,990]; Claim 12. The communication device of claim 11 wherein each communication device includes at least one of an internet connection, a GPS connection, a radio frequency (RF) connection, or a central processing unit (cpu).
4. Operating System (OS): [Patent RE43,990] Claim 25. The communication device of claim 11 wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.
5. Internet WiFi: [Patent RE43,990]; Claim 12. The communication device of claim 11 wherein each communication device includes at least one of an internet connection, a GPS connection, a radio frequency (RF) connection, or a central processing unit (cpu).
6. Gateway – Interface: [Patent RE43,990]; Claim 32. The communication device of claim 11 wherein the communication device having products to be monitored, the devices that are monitoring, communication devices, communication equipment can be grouped into anti-terrorist product groupings based on the categories of similarities of design of at least one of; sensors, software, interfaces, detector cases, locks, mobile communication devices, handheld communication devices, vehicle slowing and stopping devices.
7. Disabling Lock Mechanism after Multiple Failed Attempts: [Patent RE43,990]; Claim 22. The communication device of claim 11 wherein the communication device is designed to be equipped with applications for the locking, disabling a lock, enabling a lock, and unlocking the locks of, but not limited to, containers, vehicles, houses and businesses, using a smart phone, cell phone, PDA, laptop or desktop.
8. Biometric Fingerprint Facial Iris: [Patent RE43,990]; Claim 30. The communication device of claim 11 wherein the communication device is designed to be used with or without biometrics for authentication and identification, with at least one of a fingerprint recognition...
9. Radio Frequency (RF) Near Field Communication (NFC): [Patent RE43,990]; Claim 23. The communication device of claim 11 wherein the communication device is designed to be equipped with a radio frequency (RF) chip for the locking, disabling a lock, enabling a lock, and unlocking the locks of, but not limited to, containers, vehicles, houses and businesses, capable of a two-way, bi-directional radio frequency (RF) communication link that makes the communication device work as a radio frequency (RF) sensor or a radio frequency (RF) transceiver.

10. Interface: [Patent RE43,990]; Claim 78. The built-in, embedded multi sensor detection system of claim 74 wherein the product includes at least one of a built-in, embedded internet component, a global positioning (GPS) component, a navigation component, a tracking component, a cellular component, a satellite component, a short and long range radio frequency component, radio frequency (RF) sensor, radio frequency (RF) transceiver, Wi-Fi, antenna, Bluetooth, or interface/gateway component.
11. CPU: [Patent RE43,990]; Claim 108. The multi-sensor detection system of claim 103 wherein the cell phone, the smart phone, and the cell phone detector case can be adapted or incorporated with cell phone towers and satellites for use with at least one of satellite communication, a cell tower, wi-fi, wi-max, broadband, GPS, navigation, radio frequency (RF) chips, radio frequency (RF) sensors, radio frequency (RF) transceivers, and radio frequencies for short and long range transmissions interconnected to a central processing unit (cpu).
12. Cellular: [Patent RE43,990]; Claim 78. The built-in, embedded multi sensor detection system of claim 74 wherein the product includes at least one of a built-in, embedded internet component, a global positioning (GPS) component, a navigation component, a tracking component, a cellular component, a satellite component, a short and long range radio frequency component, radio frequency (RF) sensor, radio frequency (RF) transceiver, Wi-Fi, antenna, Bluetooth, or interface/gateway component.
13. Location Capability: [Patent RE43,990]; Claim 78. The built-in, embedded multi sensor detection system of claim 74 wherein the product includes at least one of a built-in, embedded internet component, a global positioning (GPS) component, a navigation component, a tracking component, a cellular component, a satellite component, a short and long range radio frequency component, radio frequency (RF) sensor, radio frequency (RF) transceiver, Wi-Fi, antenna, Bluetooth, or interface/gateway component.
14. Satellite: [Patent RE43,990]; Claim 78. The built-in, embedded multi sensor detection system of claim 74 wherein the product includes at least one of a built-in, embedded internet component, a global positioning (GPS) component, a navigation component, a tracking component, a cellular component, a satellite component, a short and long range radio frequency component, radio frequency (RF) sensor, radio frequency (RF) transceiver, Wi-Fi, antenna, Bluetooth, or interface/gateway component.
15. Location Capability: [Patent RE43,990]; Claim 78. The built-in, embedded multi sensor detection system of claim 74 wherein the product includes at least one of a built-in, embedded internet component, a global positioning (GPS) component, a navigation component, a tracking component, a cellular component, a satellite component, a short and long range radio frequency component, radio frequency (RF) sensor, radio frequency (RF) transceiver, Wi-Fi, antenna, Bluetooth, or interface/gateway component.
16. Sensors: [Patent RE43,990]; Claim 118. The multi-sensor detection system of claim 103 wherein the cell phone, the smart phone, and the cell phone detector case have a plurality of sensors for detecting at least one of a chemical, biological, radiological, nuclear, explosive and contraband agents and compounds which are capable of being disposed within the cell phone, the smart phone, or the cell phone detector case.

17. Chemical Sensor: [Patent RE43,990]; Claim 118. The multi-sensor detection system of claim 103 wherein the cell phone, the smart phone, and the cell phone detector case have a plurality of sensors for detecting at least one of a chemical, biological, radiological, nuclear, explosive and contraband agents and compounds which are capable of being disposed within the cell phone, the smart phone, or the cell phone detector case.
18. Radiological Sensor: [Patent RE43,990]; Claim 118. The multi-sensor detection system of claim 103 wherein the cell phone, the smart phone, and the cell phone detector case have a plurality of sensors for detecting at least one of a chemical, biological, radiological, nuclear, explosive and contraband agents and compounds which are capable of being disposed within the cell phone, the smart phone, or the cell phone detector case.
19. Explosive Sensor: [Patent RE43,990]; Claim 118. The multi-sensor detection system of claim 103 wherein the cell phone, the smart phone, and the cell phone detector case have a plurality of sensors for detecting at least one of a chemical, biological, radiological, nuclear, explosive and contraband agents and compounds which are capable of being disposed within the cell phone, the smart phone, or the cell phone detector case.
20. Biological Sensor: [Patent RE43,990]; Claim 118. The multi-sensor detection system of claim 103 wherein the cell phone, the smart phone, and the cell phone detector case have a plurality of sensors for detecting at least one of a chemical, biological, radiological, nuclear, explosive and contraband agents and compounds which are capable of being disposed within the cell phone, the smart phone, or the cell phone detector case.
21. Nuclear Sensor: [Patent RE43,990]; Claim 118. The multi-sensor detection system of claim 103 wherein the cell phone, the smart phone, and the cell phone detector case have a plurality of sensors for detecting at least one of a chemical, biological, radiological, nuclear, explosive and contraband agents and compounds which are capable of being disposed within the cell phone, the smart phone, or the cell phone detector case.
22. Human Sensor: [Patent RE43,990]; Claim 125. A multi-sensor detection system for monitoring products and capable of operating with at least one of a designated perimeter sensor, a range sensor, a human sensor, a light sensor, a video sensor, a tampering sensor, a breach sensor, a temperature sensor, or a door sensor for an unauthorized or unscheduled door opening, comprising: at least one communication device of a cell phone, a cell phone detector case, a smart phone, a handheld, a PDA, a laptop, or a computer terminal at a monitoring site, and wherein the communication device has a central processing unit (cpu); at least one sensor that is a designated perimeter sensor, range sensor, human sensor
23. Power Source: [Patent RE43,990]; Claim 80. The built-in, embedded multi sensor detection system of claim 74 wherein the product includes at least one of a built-in, embedded detector case, sensor array, central processing unit (CPU), power source of fuel, electric, solar or battery, automatic/mechanical internal or external lock disabler, remote internal or external lock disabler, biometric reader, camera, light, video, or interface.

24. **Interface:** [Patent RE43,990]; Claim 78. The built-in, embedded multi sensor detection system of claim 74 wherein the product includes at least one of a built-in, embedded internet component, a global positioning (GPS) component, a navigation component, a tracking component, a cellular component, a satellite component, a short and long range radio frequency component, radio frequency (RF) sensor, radio frequency (RF) transceiver, WiFi, antenna, Bluetooth, or interface/gateway component.
25. **Gateway – Interface:** With the CBRNE-H Detection Device, the smartphone is the gateway. Using smartphones as our gateway to the Internet of Things we can add more context into activities. A complete Internet of Things (IoT) system integrates four distinct components: sensors/devices, connectivity, data processing, and a user interface. The sensors/devices can be connected to the cloud through a variety of methods including: cellular, satellite, WiFi, Bluetooth, low-power wide-area networks (LPWAN), or connecting directly to the internet.
26. **Respondent's Central Processing Unit (CPU):** This is the "brain" of the smartphone. The central processing unit (CPU) receives commands, makes instant calculations, and sends signals throughout the device. How the parts of the processor work together: The CPU connectivity features (GPS, WiFi), and 3G/4G modem are the major components of a mobile processor that control the operation of some of the most powerful and power-efficient smartphones.
27. **Operating System (OS):** Mobile operating systems combine features of a personal computer operating system with other features useful for mobile or handheld use; usually including, and most of the following considered essential in modern mobile systems; a cellular, Bluetooth, WiFi, Global Positioning System (GPS) mobile navigation, speech recognition, near field communication (NFC).
28. **Internet / WiFi:** Connected devices also generate massive amounts of Internet traffic, including loads of data that can be used to make the devices useful. The Internet of Things (IoT), also sometimes referred to as the Internet of Everything (IoE), consists of all the web-enabled devices that collect, send and act on data they acquire from their surrounding environments using embedded sensors, processors and communication hardware. These devices, often called "connected" or "smart" devices, can sometimes talk to other related devices, a process called machine-to-machine (M2M) communication. The sensors/devices can be connected to the cloud through a variety of methods including: cellular, satellite, WiFi, Bluetooth, low-power wide-area networks (LPWAN), or connecting directly to the internet.
29. **Wireless/Cellular Modem:** These components control your connection to the world. Broadly speaking, the RF Transceiver receives and transmits voice connections and the modem enables your phone to send and receive digital signals. When enabled with 4G LTE, the radio and modem have a high-speed cellular wireless network at their disposal, capable of speeds that mimic your home Wi-Fi connection. When working closely with the CPU and GPU, a 4G LTE modem can deliver seamless, fluid access from your LTE network to your applications.
30. **Global Positioning System (GPS):** Your smartphone's GPS receiver analyzes high-frequency radio waves sent out from each satellite, with synchronized clocks in both the receiver and satellite recording the time that signals are transmitted, with the GPS chip timing exactly how long it takes to get from the satellite to your mobile phone – and it knows the speed of the signal, so with both those pieces of information, it can

work out the distance from the satellite. As long as your mobile device is receiving signal from three or more satellites, it's possible to work out where you are, by calculating how far you are from each satellite.

31. Radio Frequency (RF) Near Field Communication (NFC): NFC is a method of wireless data transfer that detects and then enables technology in close proximity to communicate without the need for an internet connection. The tech involved is deceptively simple: an NFC chip operates as one part of a wireless link. Once it's activated by another chip, small amounts of data between the two devices can be transferred when held a few centimeters from each other.

32. Biometric Fingerprint, Facial, and Iris: Previously seen mostly in military devices and fixed installations, iris scanning is joining other biometric authentication methods (such as fingerprint scanning, facial recognition and voice recognition) intended to move mobile devices beyond the limitations of password-based security.

33. Disabling Lock Mechanism after Multiple Failed Attempts: If you or someone else enters the wrong passcode too many times, your device will disable itself temporarily. The device can be remotely wiped after the specified number of failed password attempts.

LG V30 SPECS

DOMESTIC ECONOMY:
VERSION H931 (AT&T); H932 (T-Mobile); LS998U (Sprint); US998 (U.S. Cellular); VS996 (Verizon Wireless); USA – (QUALCOMM)

Versions: H930 (Europe); H930DS (Hong Kong); H933 (Canada); **H931 (AT&T); H932 (T-Mobile); VS996 (Verizon); US998 (US Cellular); LS998U (Sprint)**
Also known as LG V30+ with 128 GB storage; LG V30+ Dual H930DS with dual-SIM card slots

NETWORK	Technology	GSM / HSPA / LTE
LAUNCH	Announced	2017, August
BODY	Status	Available. Released 2017, September
	Dimensions	151.7 x 75.4 x 7.3 mm (5.97 x 2.97 x 0.29 in)
	Weight	158 g (5.57 oz)
SIM		Single SIM (Nano-SIM) or Hybrid Dual SIM (Nano-SIM, dual stand-by)
DISPLAY	Type	P-OLED capacitive touchscreen, 16M colors
	Size	6.0 inches, 92.9 cm ² (~81.2% screen-to-body ratio)
	Resolution	1440 x 2880 pixels, 18:9 ratio (~537 ppi density)
Multitouch	Yes	
Protection		Corning Gorilla Glass 5
		- Dolby Vision/HDR10 compliant
		- Always-on display
		- LG UX 6.0+
PLATFORM	OS	Android 7.1.2 (Nougat)
	Chipset	Qualcomm MSM8998 Snapdragon 835

Octa-core (4x2.45 GHz Kryo & 4x1.9 GHz Kryo)	
CPU	GPU
MEMORY	Card slot
CAMERA	<p>Internal Primary</p> <p>Dual 16 MP (f/1.6, OIS, 3-axis, laser & phase detection autofocus) + 13 MP (f/1.9, no AF), LED flash, <u>check quality</u></p>
FEATURES	<p>1.0 µm pixel size, geo-tagging, touch focus, face detection, HDR, panorama</p> <p>Video</p> <p>2160p@30fps, 1080p@30fps, 720p@120fps, 24-bit/192kHz stereo sound rec., HDR video, <u>check quality</u></p> <p>Secondary Alert types</p> <p>5 MP, f/2.2, 1/5" sensor size, 1.12 µm pixel size</p> <p>Vibration; MP3, WAV ringtones</p> <p>Loudspeaker</p> <p>Yes</p> <p>3.5mm jack</p> <p>Yes</p> <ul style="list-style-type: none"> - 32-bit/192kHz audio - B&O Play certified - 24-bit/48kHz audio recording - Active noise cancellation with dedicated mic <p>COMMS WLAN</p> <p>Wi-Fi 802.11 a/b/g/n/ac, dual-band, Wi-Fi Direct, DLNA, hotspot</p> <p>Bluetooth</p> <p>5.0, A2DP, LE, aptX HD</p> <p>GPS</p> <p>Yes, with A-GPS, GLONASS, GALILEO</p> <p>NFC</p> <p>Yes</p> <p>Radio</p> <p>Stereo FM radio with RDS</p> <p>USB</p> <p>3.1, Type-C 1.0 reversible connector</p> <p>FEATURES Sensors</p> <p>Fingerprint (rear-mounted), accelerometer, gyro, proximity, compass, barometer, color spectrum</p>

Messaging	SMS(threaded view), MMS, Email, Push Mail, IM
Browser	HTML5
Java	No
	<ul style="list-style-type: none"> - Fast battery charging: 50% in 36 min (Quick Charge 3.0) - Wireless charging - MP4/Dvi/Xvid/H.265/WMV player - MP3/WAV/FLAC/eAAC+/WMA player - Photo/video editor - Document editor
BATTERY	Non-removable Li-Po 3300 mAh battery
MISC	Aurora Black, Cloud Silver, Moroccan Blue, Lavender Violet
TESTS	<p>Basemark OS II: 3177 / Basemark X: 33719 Contrast ratio: 207000 (nominal), 4.022 (sunlight)</p> <p>Photo / Video Voice 66dB / Noise 72dB / Ring 84dB Noise -93.2dB / Crosstalk -94.2dB <u>Endurance rating 87h</u></p>
Colors	About 900 EUR
Price	
Performance	
Display	
Camera	
Loudspeaker	
Audio quality	
Battery life	

Technical Rational

COMPLAINANT'S DEVICE: CMDC

LG WATCH SPORT

RESPONDENT'S MOBILE DEVICE: LG V30

LG Watch Sport (electronic device industry and wearable medical device industry); LG V30 Smartphone (mobile device industry)	Patent #: 9,589,439; Independent Claim 19	Patent #: RE 43,990; Dependent Claims
The LG Watch Sport smartwatch with a list of radios that resembles that of a smartphone. The standards are there: Bluetooth and Wi-Fi. It also has GPS and LTE so you can track your location and get calls without carrying your phone. It includes NFC and is the first watch to support Android Pay. It features an optical heart rate monitor and antennas built into the band for LTE network connectivity. You can track your running pace, speed, time, heart rate, and you can even measure weight training reps at the gym. The LG Watch Sport measures your heart rate using a light reflection process: pulse oximeters measure heart rate and oxygen content by shining a light through your skin. Different amounts of light bounce back depending on how much blood is flowing. By measuring changes in reflected light, pulse oximeters can track how fast your heart is beating. Detect barometric pressure, track movements with gyroscope and accelerometer; monitor heart rate with PPG. When your phone and watch are paired, you'll see "Connected" on the Android Wear app on your phone.	A multi-sensor detection system for detecting at least one explosive, nuclear, contraband, chemical, biological, human, radiological agent, or compound, comprising: 118. The multi-sensor detection system [of claim 103] wherein the cell phone, the smart phone, and the cell phone detector case have a plurality of sensors for detecting at least one of a chemical, biological, radiological, nuclear, explosive and contraband agents and compounds which are capable of being disposed within the cell phone, the smart phone, or the cell phone detector case.	

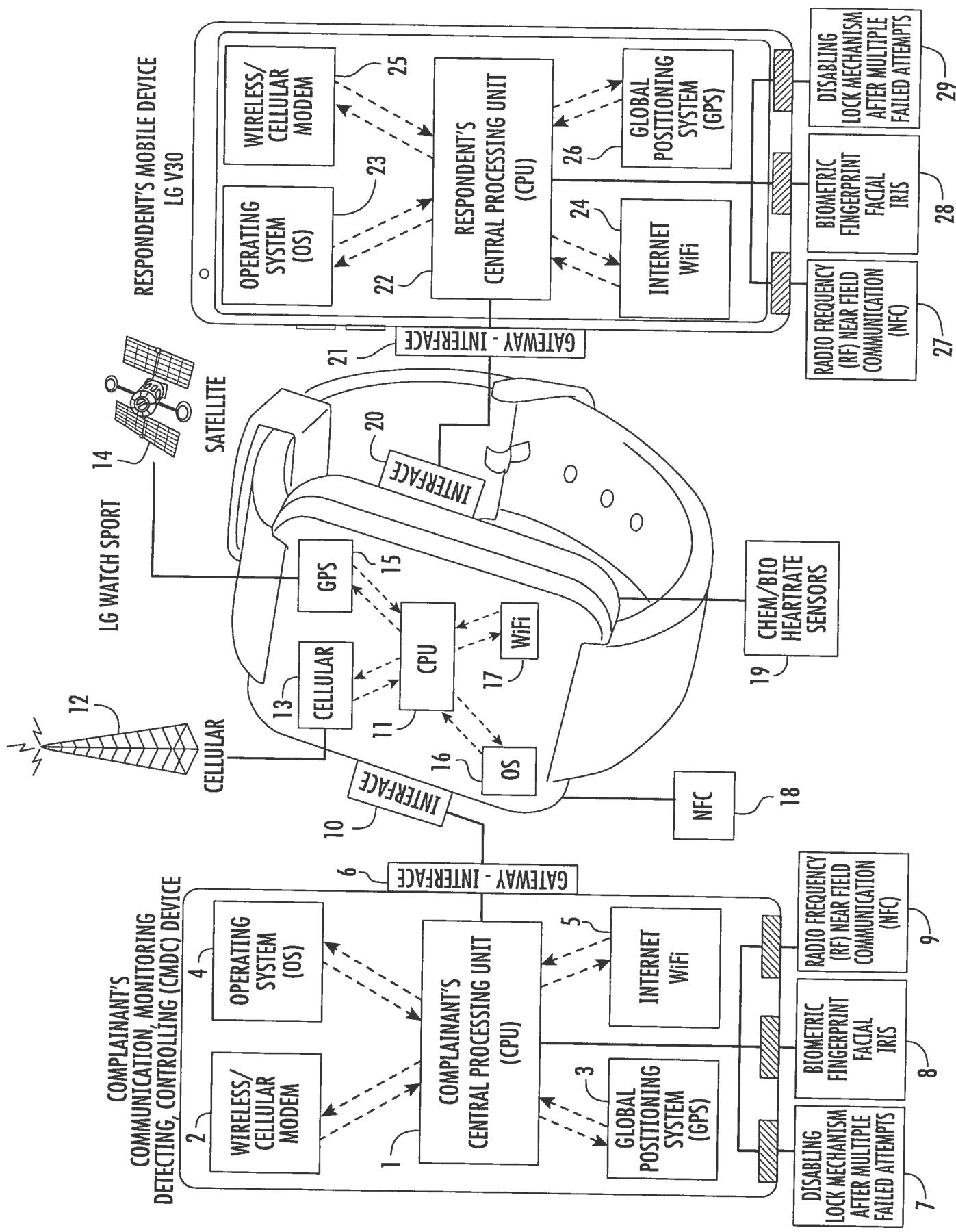
<p>The LG Watch Sport measures your heart rate using a light reflection process: pulse oximeters measure heart rate and oxygen content by shining a light through your skin. Different amounts of light bounce back depending on how much blood is flowing. By measuring changes in reflected light, pulse oximeters can track how fast your heart is beating. Detect barometric pressure, track movements with gyroscope and accelerometer; monitor heart rate with PPG.</p>	<p>a plurality of sensors for detecting at least one chemical, biological, radiological, explosive, nuclear, human, or contraband agent or compound, capable of being disposed within, on, upon or adjacent a multi-sensor detection device;</p> <p>118. The multi-sensor detection system [of claim 103] wherein the cell phone, the smart phone, and the cell phone detector case have a plurality of sensors for detecting at least one of a chemical, biological, radiological, nuclear, explosive and contraband agents and compounds which are capable of being disposed within the cell phone, the smart phone, or the cell phone detector case.</p>	<p>monitoring equipment comprising at least one of a computer, personal computer (PC), laptop, notebook PC, handheld, cell phone, personal digital assistant (PDA) or smart phone for at least one of a receipt or transmission of signals therebetween;</p> <p>118. The multi-sensor detection system [of claim 103] wherein the cell phone, the smart phone, and the cell phone detector case have a plurality of sensors for detecting at least one of a chemical, biological, radiological, nuclear, explosive and contraband agents and compounds which are capable of being disposed within the cell phone, the smart phone, or the cell phone detector case.</p>	<p>at least one cell phone tower interconnected to the monitoring equipment for sending signals thereto and receiving signals therefrom or at least one satellite capable of transmitting signals to the monitoring equipment;</p> <p>92. The multi-sensor detection system [of claim 81], further comprising a global positioning system (GPS) receiver adapted for communication with at least one satellite.</p>
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<p>The LG Watch Sport even connects to wireless networks using your primary mobile number thanks to NumberSync. With NumberSync: Make and receive calls and texts on your watch from your smartphone's mobile number, even when your phone is nowhere near. When your phone and watch are paired, you'll see "Connected" on the Android Wear app on your phone.</p>	<p>at least one satellite or at least one cell phone tower capable of signal communication between the multi-sensor detection device and the monitoring equipment;</p>	<p>25. The communication device [of claim 11] wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.</p>
<p>The LG Watch Sport packs almost every radio you'd find in a smartphone—LTE, NFC, GPS, WiFi, and Bluetooth. LTE gives it independent access to the Internet, so messages and notifications arrive no matter where you are.</p>	<p>at least one internet connection capable of communication between the multi-sensor detection device and the monitoring equipment; a central processing unit (cpu).</p>	<p>12. The communication device [of claim 11] wherein each communication device includes at least one of an internet connection, a GPS connection, a radio frequency (RF) connection, or a central processing unit (cpu).</p>
<p>The LG Watch Sport packs almost every radio you'd find in a smartphone—LTE, NFC, GPS, WiFi, and Bluetooth. LTE gives it independent access to the Internet, so messages and notifications arrive no matter where you are. There's near-field communication (NFC) on board that gives an alternative way to pay for things from the watch.</p>	<p>whereupon a signal sent to a receiver of the multi-sensor detection device from a satellite; or to a cell phone tower; or through at least one of a short range radio frequency or a long range radio frequency; causes a signal to be sent to the monitoring equipment that includes at least one of location data or sensor data;</p>	<p>92. The multi-sensor detection system [of claim 81], further comprising a global positioning system (GPS) receiver adapted for communication with at least one satellite.</p>

The LG Watch Sport smartwatch with a list of radios that resembles that of a smartphone. The standards are there: Bluetooth and Wi-Fi. It also has GPS and LTE so you can track your location and get calls without carrying your phone. It includes NFC and is the first watch to support Android Pay. It features an optical heart rate monitor and antennas built into the band for LTE network connectivity. You can track your running pace, speed, time, heart rate, and you can even measure weight training reps at the gym. The LG Watch Sport measures your heart rate using a light reflection process: pulse oximeters measure heart rate and oxygen content by shining a light through your skin. Different amounts of light bounce back depending on how much blood is flowing. By measuring changes in reflected light, pulse oximeters can track how fast your heart is beating. Detect barometric pressure, track movements with gyroscope and accelerometer; monitor heart rate with PPG. When your phone and watch are paired, you'll see "Connected" on the Android Wear app on your phone.

124. The multi-sensor detection system [of claim 103] wherein the cell phone, the smart phone, and the cell phone detector case have products to be monitored, the devices that are monitoring, communication devices, communication equipment can be grouped into anti-terrorist product groupings based on the categories of similarities of design of at least one of: sensors, software, interfaces, detector cases, locks, mobile communication devices, handheld communication devices...; similarities in material composition of at least one of: steel, stainless steel, composites, brass, copper, aluminum, fiber, silicon, plastic, combining of materials parts or elements to form a whole; similarities in security problems of at least one of: theft, detection for chemical, biological, radiological, nuclear, explosive compounds and agents, detection for weapons of mass destruction, biometrics for identifying terrorist, scanning to identify a terrorist threat; grouping security devices to form a network of ubiquitous sensing and detecting.

<p>The LG Watch Sport packs almost every radio you'd find in a smartphone—LTE, NFC, GPS, WiFi, and Bluetooth. LTE gives it independent access to the Internet, so messages and notifications arrive no matter where you are.</p>	<p>wherein at least one of a satellite connection, Bluetooth connection, WiFi connection, internet connection, radio frequency (RF) connection, cellular connection, broadband connection, long range radio frequency connection, or short range radio frequency (RF) connection is capable of signal communication with the transmitter, a receiver of the monitoring equipment, the multi-sensor detection device, or transceivers of the products;</p>	<p>12. The communication device [of claim 11] wherein each communication device includes at least one of an internet connection, a GPS connection, a radio frequency (RF) connection, or a central processing unit (cpu).</p> <p>99. The multi-sensor detection system [of claim 81], wherein the multi sensor detection device is capable of transmitting biometric and authentication data including, but is not limited to, fingerprint recognition, voice recognition, face recognition, hand geometry, retina scan, iris scan, heart rate, pulse and signature.</p>	
	<p>When your LG V30 smartphone and the LG Watch Sport are paired, you'll see "Connected" on the Android Wear app on your phone. LG V30 features include sensors for face/smile detection, iris scanner, and fingerprint recognition. The biometric authentication means are leveraged between devices to prevent unauthorized use.</p>	<p>wherein the monitoring equipment is equipped with a biometric lock disabler that incorporates at least one of a fingerprint recognition, voice recognition, face recognition, hand geometry, retina scan, iris scan or signature such that the monitoring device that is at least one of the computer, the laptop, the notebook, the PC, the handheld, the cell phone, the PDA, or the smart phone is locked by the biometric lock disabler to prevent unauthorized use;</p>	<p>25. The communication device of [claim 11] wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.</p>



1. Complainant's Central Processing Unit (CPU): [Patent RE43,990]; Claim 16. The communication device of claim 11 wherein the communication device can be adapted or incorporated with cell phone towers and satellites for use with satellite communication and/or a cell tower, wi-fi, wi-max, broadband, GPS, navigation, radio frequency (RF) chips, radio frequency (RF) sensors, radio frequency (RF) transceivers, and radio frequencies for short and long range transmissions interconnected to the central processing unit (cpu).
2. Wireless/Cellular Modem: [Patent RE43,990]; Claim 25. The communication device of claim 11 wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.
3. Global Positioning System (GPS): [Patent RE43,990]; Claim 12. The communication device of claim 11 wherein each communication device includes at least one of an internet connection, a GPS connection, a radio frequency (RF) connection, or a central processing unit (cpu).
4. Operating System (OS): [Patent RE43,990] Claim 25. The communication device of claim 11 wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.
5. Internet WiFi: [Patent RE43,990]; Claim 12. The communication device of claim 11 wherein each communication device includes at least one of an internet connection, a GPS connection, a radio frequency (RF) connection, or a central processing unit (cpu).
6. Gateway – Interface: [Patent RE43,990]; Claim 32. The communication device of claim 11 wherein the communication device having products to be monitored, the devices that are monitoring, communication devices, communication equipment can be grouped into anti-terrorist product groupings based on the categories of similarities of design of at least one of; sensors, software, interfaces, detector cases, locks, mobile communication devices, handheld communication devices, vehicle slowing and stopping devices.
7. Disabling Lock Mechanism after Multiple Failed Attempts: [Patent RE43,990]; Claim 22. The communication device of claim 11 wherein the communication device is designed to be equipped with applications for the locking, disabling a lock, enabling a lock, and unlocking the locks of, but not limited to, containers, vehicles, houses and businesses, using a smart phone, cell phone, PDA, laptop or desktop.
8. Biometric Fingerprint Facial Iris: [Patent RE43,990]; Claim 30. The communication device of claim 11 wherein the communication device is designed to be used with or without biometrics for authentication and identification, with at least one of a fingerprint recognition...
9. Radio Frequency (RF) Near Field Communication (NFC): [Patent RE43,990]; Claim 23. The communication device of claim 11 wherein the communication device is designed to be equipped with a radio frequency (RF) chip for the locking, disabling a lock, enabling a lock, and unlocking the locks of, but not limited to, containers, vehicles, houses and businesses, capable of a two-way, bi-directional radio frequency (RF) communication link that makes the communication device work as a radio frequency (RF) sensor or a radio frequency (RF) transceiver.

10. Interface: [Patent RE43,990]; Claim 78. The built-in, embedded multi sensor detection system of claim 74 wherein the product includes at least one of a built-in, embedded internet component, a global positioning (GPS) component, a navigation component, a tracking component, a cellular component, a satellite component, a short and long range radio frequency component, radio frequency (RF) sensor, radio frequency (RF) transceiver, Wi-Fi, antenna, Bluetooth, or interface/gateway component.
11. CPU: [Patent RE43,990]; Claim 108. The multi-sensor detection system of claim 103 wherein the cell phone, the smart phone, and the cell phone detector case can be adapted or incorporated with cell phone towers and satellites for use with at least one of satellite communication, a cell tower, wi-fi, wi-max, broadband, GPS, navigation, radio frequency (RF) chips, radio frequency (RF) sensors, radio frequency (RF) transceivers, and radio frequencies for short and long range transmissions interconnected to a central processing unit (cpu).
12. Cellular: [Patent RE43,990]; Claim 78. The built-in, embedded multi sensor detection system of claim 74 wherein the product includes at least one of a built-in, embedded internet component, a global positioning (GPS) component, a navigation component, a tracking component, a cellular component, a satellite component, a short and long range radio frequency component, radio frequency (RF) sensor, radio frequency (RF) transceiver, Wi-Fi, antenna, Bluetooth, or interface/gateway component.
13. Cellular: [Patent RE43,990]; Claim 78. The built-in, embedded multi sensor detection system of claim 74 wherein the product includes at least one of a built-in, embedded internet component, a global positioning (GPS) component, a navigation component, a tracking component, a cellular component, a satellite component, a short and long range radio frequency component, radio frequency (RF) sensor, radio frequency (RF) transceiver, Wi-Fi, antenna, Bluetooth, or interface/gateway component.
14. Satellite: [Patent RE43,990]; Claim 78. The built-in, embedded multi sensor detection system of claim 74 wherein the product includes at least one of a built-in, embedded internet component, a global positioning (GPS) component, a navigation component, a tracking component, a cellular component, a satellite component, a short and long range radio frequency component, radio frequency (RF) sensor, radio frequency (RF) transceiver, Wi-Fi, antenna, Bluetooth, or interface/gateway component.
15. GPS: [Patent RE43,990]; Claim 78. The built-in, embedded multi sensor detection system of claim 74 wherein the product includes at least one of a built-in, embedded internet component, a global positioning (GPS) component, a navigation component, a tracking component, a cellular component, a satellite component, a short and long range radio frequency component, radio frequency (RF) sensor, radio frequency (RF) transceiver, Wi-Fi, antenna, Bluetooth, or interface/gateway component.
16. Operating System: [Patent RE43,990] Claim 25. The communication device of claim 11 wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.

17. Wi-Fi: [Patent RE43,990]; Claim 25. The communication device of claim 11 wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.
18. NFC: [Patent RE43,990]; Claim 23. The communication device of claim 11 wherein the communication device is designed to be equipped with a radio frequency (RF) chip for the locking, disabling a lock, and unlocking the locks of, but not limited to, containers, vehicles, houses and businesses, capable of a two-way, bi-directional radio frequency (RF) communication link that makes the communication device work as a radio frequency (RF) sensor or a radio frequency (RF) transceiver.
19. Chem/Bio Heart Rate Sensors: [Patent RE43,990]; Claim 118. The multi-sensor detection system of claim 103 wherein the cell phone, the smart phone, and the cell phone detector case have a plurality of sensors for detecting at least one of a chemical, biological, radiological, nuclear, explosive and contraband agents and compounds which are capable of being disposed within the cell phone, the smart phone, or the cell phone detector case.
20. Interface: [Patent RE43,990]; Claim 78. The built-in, embedded multi sensor detection system of claim 74 wherein the product includes at least one of a built-in, embedded internet component, a global positioning (GPS) component, a navigation component, a tracking component, a cellular component, a satellite component, a short and long range radio frequency component, radio frequency (RF) sensor, radio frequency (RF) transceiver, Wi-Fi, antenna, Bluetooth, or interface/gateway component.
21. Gateway – Interface: With the smartwatch, the smartphone is the gateway. Using smartphones as our gateway to the Internet of Things we can add more context into activities. A complete Internet of Things (IoT) system integrates four distinct components: sensors/devices, connectivity, data processing, and a user interface. The sensors/devices can be connected to the cloud through a variety of methods including: cellular, satellite, WiFi, Bluetooth, low-power wide-area networks (LPWAN), or connecting directly to the internet. With an open gateway architecture, any smartwatch could ask any smartphone it encounters to agree to act as a gateway. The phone could then provide a connection for any low-bandwidth Internet applications running on the device.
22. Respondent's Central Processing Unit (CPU): This is the "brain" of the smartphone. The central processing unit (CPU) receives commands, makes instant calculations, and sends signals throughout the device. How the parts of the processor work together: The CPU connectivity features (GPS, WiFi), and 3G/4G modem are the major components of a mobile processor that control the operation of some of the most powerful and power-efficient smartphones.
23. Operating System (OS): Mobile operating systems combine features of a personal computer operating system with other features useful for mobile or handheld use; usually including, and most of the following considered essential in modern mobile systems; a cellular, Bluetooth, WiFi, Global Positioning System (GPS) mobile navigation, speech recognition, near field communication (NFC).

24. Internet / WiFi: Connected devices also generate massive amounts of Internet traffic, including loads of data that can be used to make the devices useful. The Internet of Things (IoT), also sometimes referred to as the Internet of Everything (IoE), consists of all the web-enabled devices that collect, send and act on data they acquire from their surrounding environments using embedded sensors, processors and communication hardware. These devices, often called "connected" or "smart" devices, can sometimes talk to other related devices, a process called machine-to-machine (M2M) communication. The sensors/devices can be connected to the cloud through a variety of methods including: cellular, satellite, WiFi, Bluetooth, low-power wide-area networks (LPWAN), or connecting directly to the internet.
25. Wireless/Cellular Modem: These components control your connection to the world. Broadly speaking, the RF Transceiver receives and transmits voice connections and the modem enables your phone to send and receive digital signals. When enabled with 4G LTE, the radio and modem have a high-speed cellular wireless network at their disposal, capable of speeds that mimic your home Wi-Fi connection. When working closely with the CPU and GPU, a 4G LTE modem can deliver seamless, fluid access from your LTE network to your applications.
26. Global Positioning System (GPS): Your smartphone's GPS receiver analyzes high-frequency radio waves sent out from each satellite, with synchronized clocks in both the receiver and satellite recording the time that signals are transmitted, with the GPS chip timing exactly how long it takes to get from the satellite to your mobile phone – and it knows the speed of the signal, so with both those pieces of information, it can work out the distance from the satellite. As long as your mobile device is receiving signal from three or more satellites, it's possible to work out where you are, by calculating how far you are from each satellite.
27. Radio Frequency (RF) Near Field Communication (NFC): NFC is a method of wireless data transfer that detects and then enables technology in close proximity to communicate without the need for an internet connection. The tech involved is deceptively simple: an NFC chip operates as one part of a wireless link. Once it's activated by another chip, small amounts of data between the two devices can be transferred when held a few centimeters from each other.
28. Biometric Fingerprint, Facial, Iris: Previously seen mostly in military devices and fixed installations, iris scanning is joining other biometric authentication methods (such as fingerprint scanning, facial recognition and voice recognition) intended to move mobile devices beyond the limitations of password-based security.
29. Disabling Lock Mechanism after Multiple Failed Attempts: If you or someone else enters the wrong passcode too many times, your device will disable itself temporarily. The device can be remotely wiped after the specified number of failed password attempts.

LG WATCH SPORT SPECS

DOMESTIC ECONOMY:
VERSION W280A: USA – (QUALCOMM)

LG Watch Sport requires at least an LG Smartphone
 Versions: W280; W280A (AT&T)

NETWORK	Technology	<u>GSM / HSPA / LTE</u>
LAUNCH	Announced	2017, February
	Status	Available, Released 2017, February
BODY	Dimensions	45.4 x 51.2 x 14.2 mm (1.79 x 2.02 x 0.56 in)
	Weight	-
Build		Stainless Steel 316L
SIM		Nano-SIM
		- IP68 certified - dust/water proof over 1.5 meter and 30 minutes
DISPLAY	Type	P-OLED capacitive touchscreen, 16M colors
	Size	1.38 inches, 12.3 cm ² (~52.8% screen-to-body ratio)
	Resolution	480 x 480 pixels, 1:1 ratio (~348 ppi density)
	Multitouch	Yes
PLATFORM	OS	Android Wear 2.0
	Chipset	Qualcomm MSM8909W Snapdragon Wear 2100
	CPU	Quad-core 1.1 GHz
MEMORY	Card slot	No
	Internal	4 GB, 768 MB RAM

CAMERA	Alert types	No
	Loudspeaker	Vibration; MP3, WAV ringtones
	3.5mm jack	Yes
COMMS	WLAN	No
	Bluetooth	Wi-Fi 802.11 b/g/n
	GPS	4.2, LE
FEATURES	NFC	Yes, with A-GPS
	Radio	No
	USB	No
BATTERY	Sensors	Accelerometer, gyro, proximity, heart rate , barometer
	Messaging	SMS, Email, IM
	Browser	No
MISC	Java	No
		- MP3 player
		- Photo viewer
	Stand-by	- Voice dial/commands
	Colors	Non-removable Li-Ion 430 mAh battery
	Price	Up to 35 h (mixed usage)
		Titanium, dark blue
		About 370 EUR

LG G6

Technical Rational

COMPLAINANT'S DEVICE: CMDC
INTERCONNECTION CAPABILITIES
RESPONDENT'S MOBILE DEVICE: LG G6

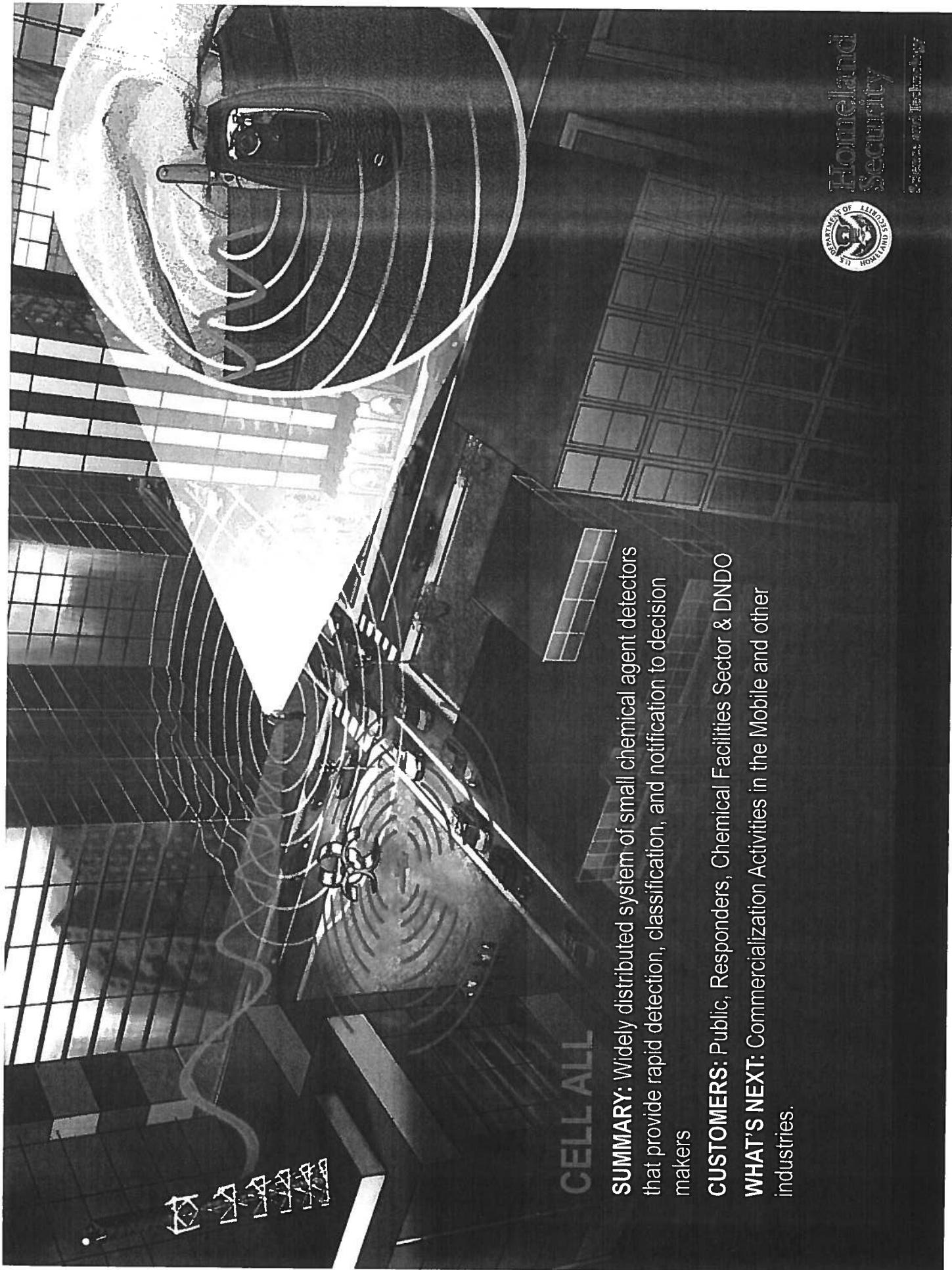
LG Electronics: LG G6 Smartphone interconnected to the LG Watch Sport (Mobile Device Industry; Electronic Device Industry; Government Industry)	<p>Patent #: 9,589,439; Independent Claim 22</p> <p>Patent #: RE 43,990; Dependent Claims</p> <p>Manufacture for the Government; 2008: The "Cell-All" initiative. The Department of Homeland Security's (DHS) Science and Technology Directorate (S&T), Cell-All aims "to equip your cell phone with a sensor capable of detecting deadly chemicals", says Stephen Dennis, Cell-All's program manager. S&T pursued cooperative agreements with four cell phone manufacturers: Qualcomm, LG, Apple, and Samsung. Used by the Government; 2016: Both the LG G6 and V30 smartphones can be used by the Department of Defense. The LG smartphones received a security certification from the U.S. Defense Information Systems Agency, as well as a certification by the National Information Assurance Partnership. Sensors will integrate with 261 million cell phones now used in the U.S. Leverage billions of dollars spent each year in sensor, carrier network and cell phone development.</p> <p>18. The communication device of [claim 11] wherein the communication device having a basic monitoring terminal can be adapted and incorporated to include desktop computers, notebook, PC's, laptops, cell phones, smart phones, LCD monitors, and satellite monitoring</p>
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<p>The LG Watch Sport is, well, sporty-looking with a big 1.38-inch, 480-by-480 P-OLED display. The device has two buttons for convenient navigation and integrates multiple sensors, including an accelerometer, barometer, ambient light, GPS, and a PPM sensor (short for photoplethysmogram, which accurately tracks heart rate when the wearer is at rest or active).</p>	<p>118. The multi-sensor detection system [of claim 103] wherein the cell phone, the smart phone, and the cell phone detector case have a plurality of sensors for detecting at least one of a chemical, biological, radiological, nuclear, explosive and contraband agents and compounds which are capable of being disposed within the cell phone, the smart phone, or the cell phone detector case.</p>
<p>LG G6 CPU: Quad-core (2x2.35 GHz Kryo & 2x1.6 GHz Kryo). The LG smartphones is equipped with more advanced embedded chipsets that can do many different tasks depending on their programming. The performance of the CPU that's at the core of the chipset is vital for the daily user experience and the general computing performance of the smartphone. LG G6 Chipset: Qualcomm MSM8996 Snapdragon 821</p>	<p>12. The communication device [of claim 11] wherein each communication device includes at least one of an internet connection, a GPS connection, a radio frequency (RF) connection, or a central processing unit (cpu).</p>
	<p>Transmits signals through at least one of a cellular, a long or short range radio frequency, or a Bluetooth connection. You can use Bluetooth to transfer information between LG G6 phone and another Bluetooth-enabled device. Quick message is the specified text message to send out.</p>

<p>Receives signals through at least one of a cellular, a long or short range radio frequency, or a Bluetooth connection. LG G6 User Guide: Notifications: Enable this option if you wish to receive a notification when a new text or multimedia message arrives.</p>	<p>28. The communication device [of claim 11] wherein the communication device can send and receive signals, data or messages from at least one of a multi-sensor detection device, a cell phone detection device, or a locking device;</p>	<p>25. The communication device [of claim 11] wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.</p>	
	<p>LG G6 OS: Android 7.0 (Nougat); cellular connection; Wi-Fi 802.11 a/b/g/n/ac, dual-band, Wi-Fi Direct, DLNA, hotspot; Bluetooth 4.2, A2DP, LE, aptX HD; GPS, with A-GPS, GLONASS, and BDS; NFC</p>	<p>30. The communication device [of claim 11] wherein the communication device is designed to be used with or without biometrics for authentication and identification, with at least one of a fingerprint recognition, voice recognition, face recognition, hand geometry, retina scan, iris scan, heart rate, pulse or signature, thereby allowing access to the product by authorized, trained, and equipped individuals and preventing access to the product by unauthorized, untrained, and unequipped individuals.</p>	

<p>After 5 unsuccessful attempts to unlock the LG smartphone, the user is prompted to enter a text phrase to confirm that they are trying to unlock the phone. The user has 10 opportunities to enter the unlock sequence. After 10 unsuccessful attempts, the phone will automatically perform a factory data reset and all of the personal files will be erased. The user is warned after the 9th unsuccessful attempt. If a Knock Code is set, after 6 unsuccessful attempts, the user is prompted to enter the Backup PIN to unlock the phone.</p>	<p>22. The communication device [of claim 11] wherein the communication device is designed to be equipped with applications for the locking, disabling a lock, enabling a lock, and unlocking the locks of, but not limited to, containers, vehicles, houses and businesses, using a smart phone, cell phone, PDA, laptop or desktop</p>	<p>30. The communication device [of claim 11] wherein the communication device is designed to be used with or without biometrics for authentication and identification, with at least one of a fingerprint recognition, voice recognition, face recognition, hand geometry, retina scan, iris scan, heart rate, pulse or signature, thereby allowing access to the product by authorized, trained, and equipped individuals and preventing access to the product by unauthorized, untrained, and unequipped individuals.</p>
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<p>The LG G6; NFC is a short-range high frequency wireless communication technology that enables the exchange of data between devices over about a 10 cm distance. It allows users to share content between digital devices, and even use their LG smartphone on existing contactless infrastructure. The significant advantage of NFC over Bluetooth is the shorter set-up time (under a 1/10 second).</p>	<p>the communication device being capable of wireless near-field communication (NFC) which allows radio frequency (RF) data to be at least one of received or transferred between the communication device and at least one tag that is read by the communication device;</p> <p>20. The communication device [of claim 11] wherein the communication device can be interconnected through wire or wireless for communication, signals, commands and transmission of data.</p>
<p>LG G6 cellular connection; Wi-Fi 802.11 a/b/g/n/ac, dual-band, Wi-Fi Direct, DLNA, hotspot; Bluetooth 4.2, A2DP, LE, aptX HD; GPS, with A-GPS, GLONASS, and BDS. Smartphone manufacturers and operators have introduced the Assisted GPS technology, which downloads the current ephemeris for a few days ahead via the wireless networks and helps triangulate the general user's position with the cell towers thus allowing the GPS receiver to get a faster lock at the expense of several (kilo)bytes.</p>	<p>whereupon a signal sent to the receiver of at least one of a multi-sensor detection device, a cell phone detection device, or a locking device from a satellite or a cell phone tower or through at least one of a Bluetooth connection, a WiFi connection, an internet connection, a cellular connection, a GPS connection, a short range radio frequency (RF) connection, or a long range radio frequency (RF) connection, causes a signal that includes at least one of location data or sensor data to be sent to the communication device; and</p> <p>25. The communication device [of claim 11] wherein the communication device has at least one of a Bluetooth connection, a Wi-Fi connection, a short and long range radio frequency connection, a Cellular connection, a satellite connection, and a GPS connection.</p>



CELL ALL

SUMMARY: Widely distributed system of small chemical agent detectors that provide rapid detection, classification, and notification to decision makers

CUSTOMERS: Public, Responders, Chemical Facilities Sector & DND

WHAT'S NEXT: Commercialization Activities in the Mobile and other industries.



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Motivations to Improve Detection

- Large, expensive, stationary systems represent state of the art chemical agent detection
- Variety of less-expensive handheld systems available as separate systems for mobile response
- Geographic coverage of these systems limited to specific areas of deployment
- Sampling may not reflect actual environment where people are actually located

Homeland
Security



Opportunity for Innovation

Large, dynamic sensing system

- Miniaturized, effective sensor capability
 - Integrate new low-cost sensing into common devices
 - Move sensing applications to the edge
 - Harvest benefits of network effects and crowd sourcing
 - Opt-In for monitored systems for Privacy Protection
 - Integrate with 300+ million cell phones now used in U.S.
 - Leverage billions of dollars spent each year in sensor, carrier network and cell phone development
 - Wireless Industry, Industrial Sensing, Defense Investments
- Result: Early indications and warning for hazardous chemical events**



**Homeland
Security**

Science and Technology

Technical Approach

Revolutionary Technology & Accelerated Prototyping Embeddable Miniature Sensors

- Sample collection
- Reusable devices with lifetimes of at least 18 months
- Functional sensor sensitivity & selectivity in the environment
- Prototype concepts for integrated sensing Devices
- Methods and concepts for disseminating of sensor information

Accelerated Prototyping

& Advance Development, Test and Evaluation

Sensing Network to Significantly Expand Coverage

- Investigate Sensor Performance in a Larger Scale Networks
- Operational Evaluation for Responder Environments
- Concepts of Operation for Ubiquitous Sensing

**Homeland
Security**



Science and Technology

CellAll Team

HSARPA Concepts, Architecture & Resources

NASA Sensor Development and Systems Integration	Leveraging years of investment in nanotechnology & sensing platforms to support manned space flight	Synkera Sensor and Sensing Module Development	Leveraging the Innovation Engine of Small Business to create a new class of miniature sensors through SBIR.	Qualcomm Inc. Systems Design/Integration	Leveraging the worlds largest semiconductor supplier to the wireless industry.
NC4	Data consolidation and visualization for 24/7 Information Service	First Responder Advisors			
Homeland Security					



Revolutionary Technology & Advanced Prototyping

- Established miniature sensor efficacy
- Discovered parameters for cell phone integration
- Developed first generation prototypes
- Proof of concept demonstrations
 - NASA – Leveraging nanosensor work for space missions to further miniaturizing space-qualified integrated sensing system for detection of chemical agents using smartphones.
 - Synkera – Leveraging SBIR funded development of miniature sensors.
- Qualcomm – Using existing hardware platform to integrate existing sensor & demonstrate ability to sense chemical agents

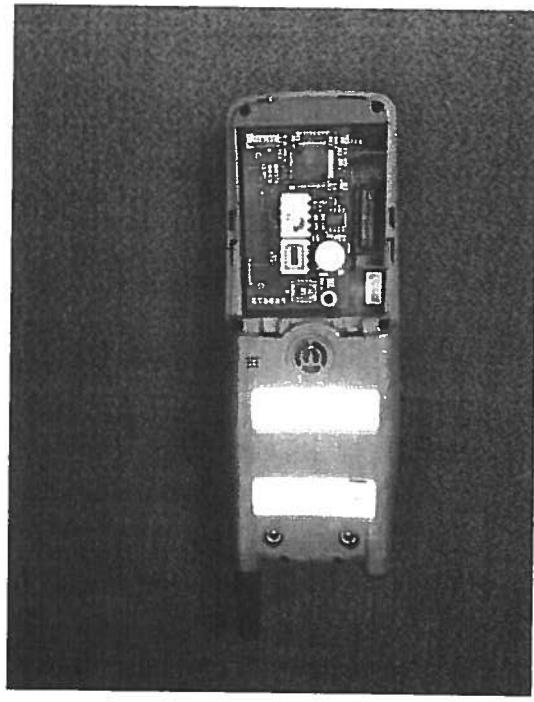
Homeland
Security



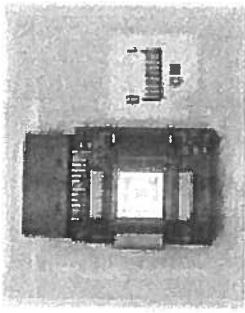
Science and Technology

Phase I Prototypes

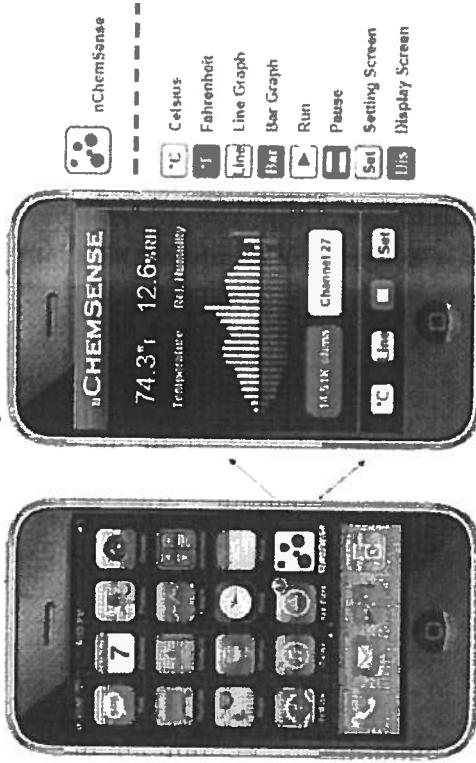
Qualcomm FFA



NASA ARC nanosensor module for iPhone integration



iPhone Specifications



**Homeland
Security**



Phase II Prototype Goals

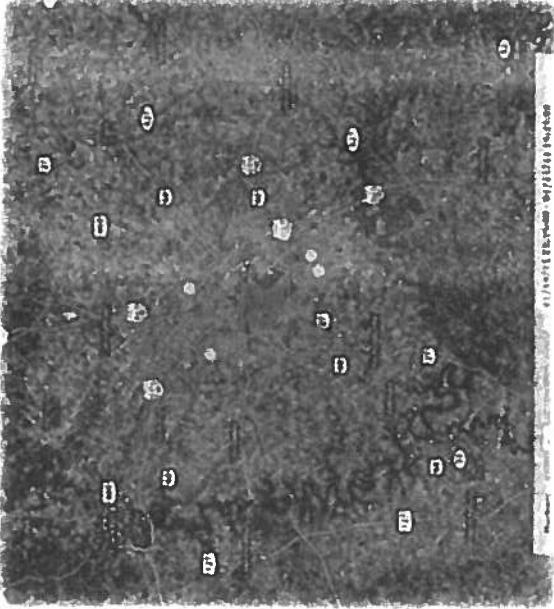
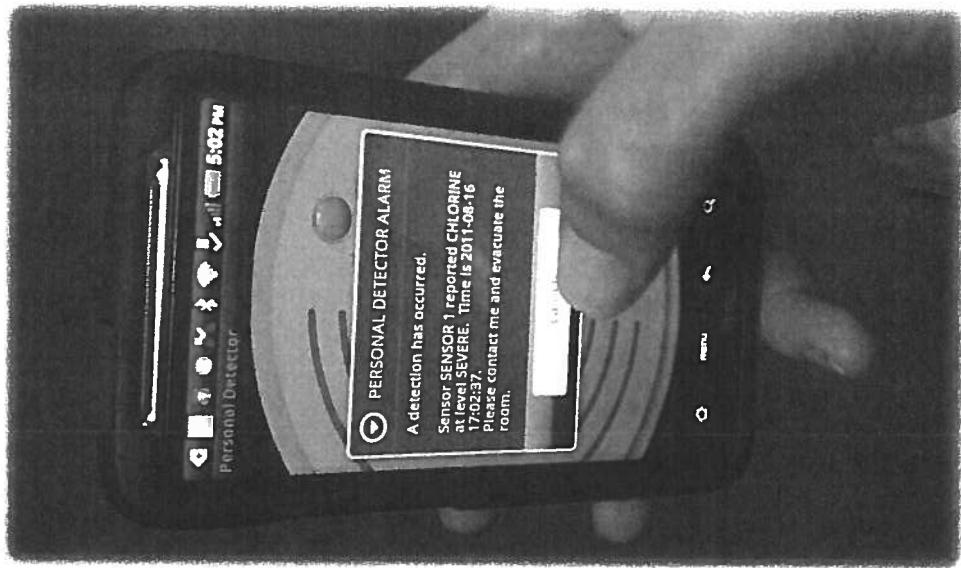
- Achieve greater number of total prototype devices at reasonable unit cost
- Sensor data transmission via 3g and/or Wi-Fi
- Multiple sensors network for chemical profiling
- Decouple chemical sensor from phone.
- Multiple sensor units per phone are possible
- Bluetooth/Proprietary Interfaces
- Standardize sensor platforms
- Increase opportunities for participation



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Science and Technology

Phase II Prototypes



**Homeland
Security**



Science and Technology

Commercial Opportunities

- Focus Group Analysis for Cell Phone Based Sensing
- Personal Protection Applications Sell
 - Privacy is Important
 - Reliance on Local Officials
 - Multiple Market Business Models
 - Spin-off Sensor Applications
 - Medical Diagnostics
- Multi-gas Detectors for Firefighter Applications

**Homeland
Security**



Science and Technology

Demonstrations

- Domestic Preparedness Application
- Toxic Chemical Agents (Public & Industrial Safety)
- Hazardous Materials Response Team Scenario
- Network response
- Geographic-based visualization

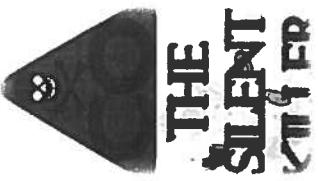
- LAFD, Frank Hotchkiss Memorial Training Center
- Carbon Monoxide (Personal Safety)
- Personal Protection Scenario - Audio Alarm
- In Case of Emergency (ICE) Alerts
- Network Command/Control

**Homeland
Security**

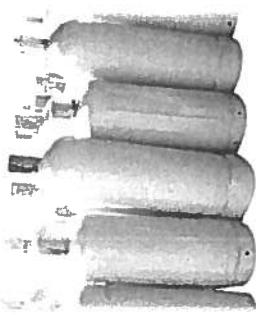


Enabling a Spectrum of Applications

Personal Safety



Industrial Safety (Critical Infrastructure)



Public Safety



Homeland Security



Status

Government Funding has Ended

Cost Shared Commercial Funding Continues

Venture Capital Active

Niche Products Available Now

First Large Scale Commercial Product Launch within 1 Year



**Homeland
Security**

Science and Technology